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SESSIONAL PAPERS

FIRST SESSION, FIFTEENTH PARLIAMENT

OF THE

PROVINCE OF BRITISH COLUMBIA

SESSION 1921

VOLUME TWO

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REPORT

OF THE

COMPTROLLER-GENERAL

OF THE PROVINCE OF

BRITISH COLUMBIA

1920-21

PURSUANT TO THE PROVISIONS OF THE "AUDIT ACT,"
CHAPTER 7. 7 & 8 GEO. V.

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PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present to Your Honour statements of the Comptroller-General pursuant to the provisions of the "Audit Act," chapter 7, 7 & 8 George V.

Respectfully submitted,

JOHN HART,

Minister of Finance.

Treasury Department,

Victoria, February 9th, 1921.

VICTORIA, February 9th, 1921.

Hon. John Hart,

Minister of Finance.

SIR,—I have the honour to submit for the information of the Legislative Assembly, pursuant to the provisions of the "Audit Act," chapter 7, 7 & 8 George V., as follows:—

(A.) Statement of Treasury Board Overrulings (pursuant to section 31).

(B.) Statement of Expenditures on Services which have exceeded their Appropriations (pursuant to subsection (*b*) of section 32).

(C.) Statement of Payments charged against the 1920-21 Appropriations which did not occur within the Period of the Account (pursuant to subsection (*e*) of section 32).

(D.) Statement of Special Warrants issued (pursuant to subsection (*b*) of section 24).

(E.) (1.) Statement showing the Revenue for the First Nine Months of the Present Fiscal Year, viz., from 1st April to 31st December, 1920.

(2.) Statement showing the Expenditure for the First Nine Months of the Present Fiscal Year, viz., from 1st April to 31st December, 1920.

(3.) Statement showing Expenditures and Advances out of Moneys raised by Loan under Authority of the Legislature for Specific Purposes, 1st April to 31st December, 1920 (pursuant to subsection (*a*) of section 42).

I have the honour to be,

Sir,

Your obedient servant,

A. N. MOUAT, C.A.,

Comptroller-General.

COMPTROLLER-GENERAL'S REPORT.

(A.)

TREASURY BOARD OVERRULINGS.

Nil.

(B.)

UNPROVIDED ITEMS IN EXPENDITURE FOR THE FISCAL YEAR ENDED 31ST MARCH, 1920.

STATEMENT of Expenditures on Services which have exceeded their Appropriations from 1st April, 1919, to 31st March, 1920, and for which Overexpenditure the Sanction of Parliament is required.

No. of Vote.	Service.	Total Appropriation.	Total Expenditure.	Overexpended.
	DEPARTMENT OF AGRICULTURE.			
10	Prairie Markets Commissioner	$ 7,140 00	$ 7,631 64	$ 491 64
17	Farmers' Institutes, etc.	10,000 00	11,537 73	1,537 73
18	Women's Institutes, etc	11,500 00	11,651 68	151 68
	DEPARTMENT OF THE ATTORNEY-GENERAL.			
41	Land Registry Office, Nelson	15,541 04	15,916 48	375 44
42	" " New Westminster	31,717 65	32,016 88	299 23
44	" " Vancouver	52,901 45	53,283 36	381 91
48	Supreme and County Courts, Nelson	2,578 75	2,616 79	38 04
54	Provincial Police	308,862 17	323,495 58	14,633 41
58	Girls' Industrial School	23,879 99	24,496 81	616 82
60	Summoning and Paying Witnesses	19,000 00	20,063 27	1,063 27
64	Rewards	2,000 00	2,125 00	125 00
67	Motor-traffic Regulation	21,000 00	21,066 54	66 54
	DEPARTMENT OF EDUCATION.			
78	Agricultural Education	20,766 70	26,015 38	5,248 68
84	*Per Capita* Grant to Cities	566,000 00	569,520 16	3,520 16
85	*Per Capita* Grant to Municipalities	338,000 00	351,676 90	13,676 90
87	Salaries of Teachers in Assisted Schools	345,000 00	346,075 15	1,075 15
	DEPARTMENT OF FINANCE.			
98	Controlling and Audit Branch	48,297 64	48,532 25	234 61
100	Bureau of Information	8,420 00	8,929 67	509 67
102	Alberni Agency	7,006 19	8,813 33	1,807 14
109	Cumberland Agency	6,784 88	7,071 47	286 59
110	Duncan Agency	5,752 91	5,822 00	69 09
112	Fernie Agency	9,058 00	9,197 60	139 60
113	Fort Fraser Agency	4,122 20	4,150 39	28 19
119	Kamloops Agency	15,709 66	16,072 58	362 92
120	Kaslo Agency	12,136 00	12,686 00	550 00
122	Merritt Agency	5,969 89	6,262 13	292 24
123	Nanaimo Agency	16,186 26	16,664 36	478 10
124	Nelson Agency	14,303 07	14,338 34	35 27
125	New Westminster Agency	24,843 26	25,073 75	230 49
128	150-Mile House Agency	4,532 26	4,558 31	26 05
129	Prince Rupert Agency	24,923 02	25,237 24	314 22
130	Princeton Agency	5,362 07	5,506 15	144 08
131	Quesnel Agency	26,488 42	27,397 48	909 06
132	Queen Charlotte Islands Sub-agency	1,110 00	1,126 47	16 47
133	Revelstoke Agency	12,835 55	12,952 29	116 74
134	Rossland Agency	9,122 00	9,151 32	29 32
136	Telegraph Creek Agency	2,340 00	2,428 16	88 16
138	Vancouver Agency	93,899 17	93,911 56	12 39
139	Vernon Agency	18,323 45	19,580 39	1,256 94
140	Victoria Assessor	20,573 43	20,684 64	111 21
141	Wilmer Sub-agency	2,271 00	2,328 02	57 02
143	Sundry Sub-agencies	2,000 00	2,397 44	397 44
	DEPARTMENT OF LANDS.			
170	Land Surveys	125,000 00	127,883 16	2,883 16
	DEPARTMENT OF THE PROVINCIAL SECRETARY.			
199	Provincial Board of Health	56,774 00	58,482 25	1,708 25
200	Provincial Library Archives	24,640 60	25,398 16	757 56
202	Mental Hospital, New Westminster	189,012 00	190,270 85	1,258 85
204	Colony Farm and Nursery	70,880 00	82,595 31	11,715 31
206	Provincial Home, Kamloops	37,942 41	38,266 01	323 60
213	King's Printer	177,459 94	180,465 58	3,005 64
214	Registration of Voters	2,500 00	2,907 09	407 09
S.W. No. 6	"Public Libraries Act, 1919"	500 00	508 21	8 21
	DEPARTMENT OF PUBLIC WORKS.			
231	General Office	54,157 47	54,617 86	460 39
232	District Engineers	49,637 06	51,882 28	2,245 22
235	"Factories Act"	7,580 00	7,639 39	59 39
238	Roads, Streets, Bridges, and Wharves	1,658,879 00	1,705,447 78	46,568 78
	DEPARTMENT OF RAILWAYS.			
240	General Office	19,764 01	19,933 43	169 42
240A	Fraser River Bridge, New Westminster	54,500 00	58,863 02	4,363 02
	CAPITAL ACCOUNT.			
247A	Industrial School and Subnormal Boys' School	10,000 00	10,083 79	83 79
		$4,717,484 57	$4,845,306 86	$127,822 29

(C)

STATEMENT OF PAYMENTS CHARGED AGAINST THE 1920–21 APPROPRIATIONS WHICH DID NOT OCCUR WITHIN THE PERIOD OF THE ACCOUNT.

DEPARTMENT OF AGRICULTURE.

Vote No.	Date of Service.	Name.	Particulars.	Amount.
5	March, 1920	Sidney and Islands Review	Advertising	$ 3 24
12	Feb., 1919	Upton, H. E.	Travelling expenses	20 00
15	March, 1920	Sullivan Bros.	Compensation for cattle destroyed	148 20
18	Feb., 1919	Smith, A. Harvey	Travelling expenses	90 00
19	Dec., 1918, Nov., 1919	Hibben, T. N., & Co.	Books	16 57
19	Jan., 1920	McGregor, Mrs. N.	Travelling expenses	23 20
19	March, Oct., and Dec., 1919	Compressed Gas Company, Ltd	Recharges, etc	9 05
30	Feb., 1920	National Drug and Chemical Co.	Preserving chemicals	24 20

DEPARTMENT OF THE ATTORNEY-GENERAL.

36	Jan., 1920	Burroughs Adding Machine Co	Adding-machine	$ 347 12
50	March, 1920	Vancouver Map & Blue Print Co	Blue-prints	7 65
54	Dec., 1919	Milton, John	Hauling	4 50
54	Jan.–Feb., 1920	City of Vernon	Board of prisoners	60 00
58	1919	City of Victoria	Taxes	10 31
59	Aug., 1919	Leigh & Sons, Messrs. James	Boxes and cartage	16 50
60	March, 1920	Hasler, F. C	Rent	30 00
60	Feb.–March, 1920	Duncan, G. J	Travelling expenses	22 85
60	March, 1920	Le Roy, C. F	Hay and oats	24 60
60	March, 1920	Pouce Coupe Trading Co	Coal-oil	3 75
60	March, 1920	Freeman, J. A	Travelling expenses	3 00
60	Feb., 1920	Gibbs, O. M.	Blacksmithing	5 75
60	Feb., 1920	Federal Transportation Co	Flash-light, lamps, and saw	13 55
60	Feb.–March, 1920	Ogilvie, R. J	Cordwood and hauling	53 00
60	March, 1920	Revillon Freres	Broom	1 25
60	March, 1920	Government Telegraph	Telegrams	13 06
60	March, 1920	Condon, M. J.	Travelling expenses	8 00
60	March, 1920	Buri, J	Special Constable	27 00
60	Feb.–March, 1920	LeRoy, C. F	Special Constable	8 00
60	Jan.–Feb., 1920	Carr, P	Travelling expenses	30 20
60	Feb.–March, 1920	Scott, David	Secret service	245 00
60	Nov., 1918	Shaw, Joe	Services *re* wreck of "Renfrew"	14 00
60	Dec., 1919	McArthur, J., & Knox	Crating	10 10
60	Dec., 1919	Lyons, Dr. O. O.	Hospital and surgical fees	92 50
60	Dec., 1919	Jarvis, A. W.	Forwarding charges	6 00
60	Apr., 1919, to Mch., 1920	Granby Con. Mining S. & P. Co., Ltd.	Rent of lock-up and quarters, Anyox	180 00
60	Dec., 1919	Gordon, J. L.	Crates and boxes	3 50
60	Dec., 1919, and Jan., 1920	City Auto Express	Auto-hire and hauling	2 75
60	Dec., 1919	Freeman, Jas. A	Salary (part)	10 00
60	Dec., 1919	Duncan, G. J.	Salary (part)	10 00
63	Dec., 1919	Barr & Anderson	Repairs	145 00
70	Jan., 1920	Tutill, G. H., M.D.	Post-mortem examination	10 00
74	Nov., 1919	French, A. S., Auto Co	Repairs to car No. 17853	46 15
77	Nov., 1919	Dallas, Alex	Reporting evidence	54 50

DEPARTMENT OF EDUCATION.

81	Oct., 1919	City of Victoria	Cartage on summer-school materials	$ 243 47
81	Dec., 1919	City of Kelowna	Grant for improvement of school-grounds	51 00
81	Dec., 1919	City of Chilliwack	Grant *re* school-gardening	75 00
82	Aug., 1919	Eastham, J. W.	Honorarium and allowances *re* summer school	90 00
83	Dec., 1919–Feb., 1920	B.C. Telephone Co., Ltd	Long distance tolls	3 57
84	Sept., 1919	Barrs, F. A. A	Installing diffuser, etc	50 00
90	March, 1920	Kelman, M. A	Salary, 1st–7th March	19 75
96	March, 1920	Municipality of Kent	Half-cost of conveying children to central school	57 50
96	Jan.–March, 1920	Municipality of Maple Ridge	" " "	262 50

STATEMENT OF PAYMENTS CHARGED AGAINST 1920-21 APPROPRIATIONS—*Continued.*

DEPARTMENT OF FINANCE.

Vote No.	Date of Service.	Name.	Particulars.	Amount.
104	Aug.-Sept., 1919..	Gregg, John	Commission on collections of revenue	$ 34 00
104	Sept. and Nov., 1919	Campbell, R. N	" "	14 00
106	June-July, 1919...	Agent-General, London	Incidental expenses	174 40
108	March, 1920.....	King's Printer	Stationery	114 68
119	Oct., 1918-March, 1920	Hudson's Bay Co	Ground-rent, Fort George	112 50
129	Jan., 1920	Burroughs Adding Machine Co	Adding-machine	354 20
143	March, 1920	Burns, H. M	Board and lodging	36 00
144	April, 1919-Feb., 1920	Nichols, W. J	Plumbing	83 97
155	Jan., 1920	Smith, Mrs. Ralph	Travelling expenses *re* Council of Immigration	215 00

DEPARTMENT OF LANDS.

161	Dec., 1919	Genoa Logging Co., Ltd	Gasolene and oil	$ 4 80
165	Feb., 1919	Fraser W. S., & Co., Ltd	Coat-hooks	50
165	Jan.-March, 1920..	Grand Forks Sun	Advertising	35 75
165	Dec., 1919	National Drug & Chemical Co., Ltd	Drugs	16 05
165	Jan., 1920	Clarke & Stewart Co., Ltd	Compasses, etc	493 80
165	Oct., 1919-March, 1920	Ashcroft Print Co., Ltd	Advertising	71 50
167	Feb., 1920	Hewett, J. D., & Co., Ltd	Freight, etc	75 27

DEPARTMENT OF MINES.

197	Jan., 1917-Jan., 1920	Grand Forks Gazette	Subscription	$ 6 00
200	Feb., 1920	Robertson, W. Fleet	Travelling expenses	79 53
200	March, 1920.....	Reliable Transfer Co	Freight and transfer	1 94

DEPARTMENT OF THE PROVINCIAL SECRETARY.

209	March, 1920..	Auxiliary Hospital, Quesnel	Expenses incurred during influenza epidemic	$ 332 80
209	Jan.-March, 1920..	Abbott, F. D	Expenses during smallpox epidemic at Enderby	600 00
209	Feb., 1920	Affleck, Dr. J. E	Medical inspection of schools	14 50
209	Feb., 1920	Felton, Dr. Richard	Vaccination, Rocky Point School	13 00
209	Jan.-Feb., 1920 ...	Bedford, A	Drugs, etc	19 00
209	Feb., 1920	Johnson, L. A	Expenses *re* quarantine of camp	266 60
210	Jan., 1913-Jan., 1914	Museum Book Store	Books	217 21
213	March, 1920.....	Hoyes, Dr. W. T	Medical examinations	10 00
213	March, 1920.....	Carling, J	Expenses *re* Jas. Deacon, insane	19 50
221	Dec., 1919-Feb., 1920	Thulin Bros	Provisions	39 85
222	Feb.-March, 1920 .	Sutherland, A. A	Salary as Resident Physician, Masset	83 33
223	Nov., 1918, Dec., 1919	Campbell Bros	Undertaking	85 00
223	March, 1920.....	Sands, Funeral Furnishing Co., Ltd	"	60 00
224	Jan.-Feb., 1920 ...	Pay-list	Retroactive compensation *re* increase in scale of wages; Composing-room, Bindery, and Press-room, King's Printer	1,367 96

DEPARTMENT OF PUBLIC WORKS.

239	Nov., 1919.....	Ashcroft Journal	Advertising	$ 8 40
244	July, 1919	B.C. Telephone Co	Installing local No. 145	3 78
246	Feb., 1920	Lemon, Gonnason & Co	Lumber	70 45
247	March, 1919, Nov., 1919	Plimley, Thomas	Repairs, etc	45 87
251	March, 1920.....	Gibbs, O. N	Blacksmithing	9 75
251	Dec., 1916	Alberta Lumber Co., Ltd	50% of amount deducted from freight account for incorrect routing	217 64
251	Dec., 1919, Jan., 1920	Pay-lists	Survey, Alice Arm Shore Road	45 00
251	Nov., 1919.....	Fraser, Wm	Labour, repairing damage done by blasting, Stewart-Hyder Road	68 00
251	1911.....	Fraser, J. A	Compensation for damage to fence and crop	250 00
251	July-Oct., 1919 ...	Imperial Oil., Ltd	Gas and oil	44 50
251	Aug., 1919.....	Kozak, M	Labour, McBride-Dunster Road	12 00

STATEMENT OF PAYMENTS CHARGED AGAINST 1920-21 APPROPRIATIONS—*Continued.*

DEPARTMENT OF PUBLIC WORKS—*Continued.*

Vote No.	Date of Service.	Name.	Particulars.	Amount.
251	Feb., 1920	Wm. White	Repairs to pinch-bar	$ 1 75
251	Sept., 1919	Government Telegraph Service	Messages	50
251	March, 1920	Vancouver Daily Sun	Advertising	4 20
251	Feb., 1920	Colebank, Mrs. A. J	Meals, etc	16 50
251	Feb.-March, 1920	Western Canadian Ranching Co., Ltd.	Stabling	21 75
251	March, 1920	Fairbairn, George	Labour, cutting out ice, 59-Mile Bridge	68 00
251	Dec., 1919-Jan., 1920	Bank of Montreal	Commission on time-checks cashed at Stewart	11 25
251	Nov., 1919	Northern Construction Co., Ltd.	Repairs to Williams Lake and Chilcotin Road Bridges	504 94
252	Nov., 1919	Heaps Engineering Co., Ltd.	Stirrups, S.S. "Beaver"	45 50
252	Dec., 1919	Jordan, James	Hauling coal	2 50
252	Jan., 1920	Belyea & Co., Ltd.	Express	2 00
252	Feb.-March, 1920	Western Canadian Ranching Co., Ltd.	Meals, etc	35 25
254	March, 1918-April, 1919	Canadian National Railways	Track maintenance, east approach, New Westminster Bridge	485 51
254	March, 1920	Moulton, C	Electrical supplies	24 10
Loan Act, 1919	Aug., 1919	Giant Powder Co., Ltd.	Stumping-powder, Atlin District	82 43
	June, 1919	Albert & McCaffery, Ltd	Coal, Atlin District	108 55
	Aug., 1919	Howe & McNulty	Plant and tools, etc	248 65

(D.)

STATEMENT OF SPECIAL WARRANTS ISSUED BETWEEN THE SESSIONS OF 1920 AND 1921.

Date of Approval.	No. of Warrant.	Service	Amount of Warrant.	Expenditure.
		TO MEET EXPENDITURE FOR THE FISCAL YEAR ENDING 31ST MARCH, 1921.		
		CURRENT ACCOUNT.		
		DEPARTMENT OF AGRICULTURE.		
Aug. 6, 1920	12	General Office	$ 180 00	.....
Aug. 6, 1920	12	Horticultural Branch	564 00	.....
Aug. 6, 1920	12	Live Stock Branch	2,000 00	.....
Aug. 6, 1920	12	Agricultural and Horticultural Inspectors, and Agricultural Representatives, etc	360 00	.....
Nov. 5, 1920	25	Compensation to city lot-holders at Vernon for fruit destroyed	1,593 75	$ 1,593 75
Nov. 15, 1920	26	Agricultural Fairs, etc	6,000 00	5,524 74
Nov. 15, 1920	26	Compensation *re* foul-brood in bees	250 00	220 15
Jan. 8, 1921	37	To provide for allotments made out of the grant due from the Dominion Government *re* "Agricultural Intsruction Act"	18,000 00	18,000 00
		DEPARTMENT OF THE ATTORNEY-GENERAL.		
May 5, 1920	1	Supreme and County Courts, Victoria	1,140 00	.....
May 12, 1920	2	Administration of the "Prohibition Act"	280 00	280 00
July 31, 1920	10	Joint-stock Companies and Insurance Branch	1,000 00	.....
July 31, 1920	10	Land Registry Office, Victoria	390 00	.....
July 31, 1920	10	Supreme and County Courts, Vancouver	335 00	.....
Aug. 26, 1920	16	Motor-traffic regulation	10,000 00	10,000 00
Oct. 12, 1920	20	Administration of "Prohibition Act"	10,000 00	3,382 99
Oct. 12, 1920	20	Land Registry Office, Kamloops	900 00	.....
Oct. 12, 1920	20	Land Registry Office, New Westminster	1,500 00	.....
Oct. 12, 1920	20	Supreme and County Courts, Victoria	576 00	.....
Oct. 15, 1920	22	Supreme and County Courts, Nelson	90 00	.....
Nov. 4, 1920	24	Supreme and County Courts, Vancouver	1,000 00	.....
Nov. 15, 1920	27	Municipal Branch	300 00	.....
Nov. 26, 1920	29	Censor of Moving Pictures	400 00	.....
Dec. 8, 1920	30	Joint Stock Companies and Insurance Branch	650 00	.....
Dec. 8, 1920	30	Supreme and County Courts, Victoria	600 00	.....
Dec. 27, 1920	31	Supreme and County Courts, Chilliwack	750 00	80 84
Jan. 15, 1921	41	Sheriff's Office, Vancouver	1,600 00	.....
Jan. 15, 1921	42	Land Registry Office, Kamloops	1,000 00	.....
Jan. 26, 1921	44	Motor-traffic regulation	5,000 00	3,954 37
Jan. 28, 1921	46	Land Registry Office, Nelson	1,000 00	.....
Feb. 7, 1921	50	Provincial Police	50,000 00	.....
		DEPARTMENY OF EDUCATION.		
Aug. 14, 1920	14	Normal School, Victoria	2,000 00	.....
Aug. 14, 1920	14	Examination of teachers and High School Entrance classes	750 00	750 00
Aug. 26, 1920	15	Examination of teachers and High School Entrance classes	500 00	181 27
Oct. 7, 1920	19	Agricultural education	133 34	.....
Oct. 7, 1920	19	Normal School, Victoria	85 50	.....
Nov. 15, 1920	28	Free Text-book Branch	830 00	830 00
Dec. 27, 1920	32	Normal School, Vancouver	1,800 00	.....
Jan. 14, 1921	40	Free Text-book Branch	7,000 00	4,440 53
Jan. 15, 1921	43	Industrial education	550 00	.....
Jan. 15, 1921	43	Inspection of schools	3,600 00	.....
Jan. 15, 1921	43	Conveying children to central schools	3,000 00	1,359 07
		DEPARTMENT OF FINANCE.		
Oct. 5, 1920	18	Nanaimo Agency	174 00	.....
		DEPARTMENT OF LANDS.		
July 15, 1920	7	General Office	41 95	.....
July 15, 1920	7	Lands Branch	30 00	.....
July 15, 1920	7	Survey Branch	120 28	.....
July 15, 1920	7	Water Rights Branch	30 00	.....
July 15, 1920	7	Forest Branch	80 00	.....
July 21, 1920	8	Forest Branch	40 00	.....
		DEPARTMENT OF LABOUR.		
Aug. 15, 1920	13	Crowsnest Pass Coal Company, Ltd.	172 35	172 35
Oct. 29, 1920	23	Allowances and expenses of British Columbia representatives to Conference at Ottawa *re* uniformity of industrial laws	657 80	418 90
		Carried forward	$139,053 97	$ 51,188 96

STATEMENT OF SPECIAL WARRANTS, 1920 AND 1921—*Continued.*

Date of Approval.	No. of Warrant.	Service.	Amount of Warrant.	Expenditure.
		TO MEET EXPENDITURE FOR THE FISCAL YEAR ENDING 31ST MARCH, 1921.—*Continued.*		
		CURRENT ACCOUNT.—*Continued.*		
		DEPARTMENT OF LABOUR.—*Continued.*		
		Brought forward	$ 139,053 97	$ 51,188 96
Jan. 8, 1921	38	To provide for contributions towards the cost of relief of destitution and want in Provincial municipalities, conditioned upon the Federal Government and the municipalities interested each contributing one-third of the cost	100,000 00	.....
		DEPARTMENT OF MINES.		
June 14, 1920	3	To provide for outfitting twenty-five parties of returned soldiers, with two men to each party, as prospectors for minerals	50,000 00	15,242 07
		DEPARTMENT OF THE PROVINCIAL SECRETARY.		
June 29, 1920	4	Registration of voters	50,000 00	40,270 35
Sept. 28, 1920	17	Provincial Museum	60 00	.....
Sept. 28, 1920	17	King's Printer	25,000 00	20,248 64
Dec. 27, 1920	33	Advances to permanent members of the Civil Service for the purpose of purchasing fuel	10,000 00	.....
Dec. 27, 1920	34	To provide for expenditures in connection with relief of unemployment	250,000 00	.....
Dec. 27, 1920	35	King's Printer	20,500 00	.....
Dec. 27, 1920	35	Workmen's Compensation Board—Assessment on Class 13	25,000 00	25,000 00
Jan. 26, 1921	45	Burial of indigent persons	1,000 00	287 00
Feb. 3, 1921	47	Advances to Police Officers of the Government of the Colony of Hong Kong	450 00	.....
		DEPARTMENT OF PUBLIC WORKS.		
July 6, 1920	5	Expenditures in connection with the change in the rule of the road, including cost of maps, etc.	5,000 00	1,338 67
July 19, 1920	6	Administration	60 00	.....
July 19, 1920	6	Maintenance of Parliament Buildings and Grounds	370 00	.....
July 21, 1920	9	Steam-boiler inspection	1,000 00	.....
Aug. 4, 1920	11	Administration	760 00	.....
Aug. 4, 1920	11	Maintenance of Parliament Buildings and Grounds	1,000 00	.....
Jan. 8, 1921	39	Administration	1,000 00	.....
Jan. 8, 1921	39	District Engineers	80 00	.....
Jan. 8, 1921	39	Steam-boiler inspection	1,554 00	.....
Feb. 7, 1921	49	Administration	1,200 00	.....
		DEPARTMENT OF RAILWAYS.		
Oct. 19, 1920	21	Fraser River Bridge, New Westminster	25,000 00	23,886 35
		CAPITAL ACCOUNT.		
Jan. 3, 1921	36	Advance to the Pacific Great Eastern Railway Company for the purpose of construction and operation of its railway and undertaking	750,000 00	625,000 00
Feb. 7, 1921	48	Girls' Industrial School	7,000 00	.....
			$1,465,087 97	$ 802,462 04

(E.)

(1.)

STATEMENT SHOWING THE REVENUE FOR THE FIRST NINE MONTHS OF THE PRESENT FISCAL YEAR, VIZ., FROM 1ST APRIL TO 31ST DECEMBER, 1920.

Estimated for 12 Months ending 31st March, 1921.	Service.	Revenue for 9 Months ended 31st December, 1920.	
	CURRENT ACCOUNT.		
	Department of Agriculture:		
$ 22,000 00	Horticultural inspection fees and licences	$ 21,185 41	
23,000 00	Seed-grain advances refunds	1,535 21	
.....	Miscellaneous	6,365 41	
$ 45,000 00			$ 29,086 03
	Department of the Attorney-General:		
$ 45,000 00	Court fees and fines	$ 59,651 92	
1,500 00	Dog licences	883 00	
75,000 00	Fur licences	2,175 00	
120,000 00	Game licences	119,593 12	
80,000 00	"Insurance Act"—Licences, taxes, and fees	76,027 67	
55,000 00	Joint-stock Companies, etc.—Registration fees	67,962 79	
10,000 00	Keep of prisoners—Reimbursement	12,293 80	
350,000 00	Land registry fees	319,047 11	
75,000 00	Law stamps	53,785 55	
650,000 00	"Motor-traffic Regulation Act"—Fees	185,340 11	
15,000 00	"Moving Pictures Act"—Fees	8,213 35	
25,000 00	"Prohibition Act"—Profit on liquor sold	.....	
25,000 00	Sheriffs' fees	14,008 43	
21,000 00	Trade licences	16,295 00	
5,000 00	Miscellaneous receipts	36,626 10	
$ 1,552,500 00			971,902 95
	Department of Education:		
$ 2,500 00	Teachers' examinations and certificates	$ 3,300 30	
1,000 00	Text-books sold	1,086 27	
42,000 00	Technical schools (Dominion grant)	3,471 25	
.....	Miscellaneous	440 20	
$ 45,500 00			8 298 02
	Department of Finance:		
	Dominion of Canada:		
$ 29,151 06	Annual interest	$ 14,575 53	
180,000 00	Annual subsidy	90,000 00	
313,984 00	Annual grant *per capita*	156,992 00	
100,000 00	Annual grant for lands conveyed	50,000 00	
$ 623,135 06		$ 311,567 53	
280,000 00	Amusements-tickets tax	245,222 23	
185,000 00	Coal and coke tax	136,674 29	
2,000,000 00	Income-tax	1,923,092 59	
	Interest:		
19,080 07	"Dyking Assessments Adjustment Act"	19,080 07	
260,000 00	Sinking fund investments	160,033 22	
450,000 00	Miscellaneous	428,152 79	
	Land taxes:		
1,115,000 00	Real property	948,982 93	
980,000 00	Wild land, coal and timber lands	814,745 70	
150,000 00	Mineral-tax	98,191 33	
800,000 00	Personal-property tax	846,188 86	
50,000 00	Polltax	244,920 00	
75,000 00	Probate fees	48,169 40	
	Rents:		
37,800 00	B.C. House, London, England	19,629 75	
200 00	Miscellaneous rents	211 80	
5,000 60	Revenue service refunds	8,672 16	
175,000 00	Rural district school taxes	194,234 09	
325,000 00	Succession duties	253,118 32	
50,000 00	Unworked Crown-granted mineral claims—Taxes	45,527 97	
53,500 00	Miscellaneous receipts	818,346 85	
44,000 00	Trust deposits reverted to Crown, intestate, 1897 to 1907	.....	
12,000 00	Trust deposits reverted to Crown, suitors' funds, 1897 to 1907	.....	
$ 7,689,715 13			$ 7,564,761 88
	Carried forward		$ 8,574,048 88

STATEMENT OF REVENUE FOR THE FIRST NINE MONTHS OF THE PRESENT FISCAL YEAR.—*Continued.*

Estimated for 12 Months ending 31st March, 1921.	Service.	Revenue for 9 Months ended 31st December, 1920.	
	CURRENT ACCOUNT—*Continued.*		
	Brought forward	.....	$ 8,574,048 88
	Department of Fisheries:		
$ 36,000 00	Fishing and cannery licences, etc.	.....	34,851 05
	Department of Lands:		
$ 19,000 00	Grazing rentals, leases, and fees	$ 14,707 53	
65,000 00	Land revenues—Sundry	110,591 67	
150,000 00	Land sales	344,473 80	
10,000 00	Survey fees and sale of maps	21,712 00	
65,000 00	Timber leases	48,152 41	
2,200,000 00	Timber licences	1,618,003 10	
350,000 00	Timber sales	231,145 44	
1,075,000 00	Timber royalties	722,547 96	
60,000 00	Water rentals and recording fees	70,780 48	
15,000 00	Miscellaneous receipts	22,639 23	
$ 4,009,000 00			3,204,753 62
	Department of Labour:		
$ 30,000 00	Dominion of Canada, subvention, etc.	.....	7,348 50
	Legislation:		
$ 2,000 00	Private Bills fees	.....	.....
	Department of Mines:		
$ 1,000 00	Bureau of Mines	$ 1,071 25	
60,000 00	Free miners' certificates	62,224 80	
1,000 00	Miners' examinations and certificates	1,025 00	
100,000 00	Mining receipts, general	92,992 55	
$ 162,000 00			157,313 60
	Department of the Provincial Secretary:		
$ 15,000 00	Colony Farm	$ 4,914 15	
14,480 00	Dominion grant, venereal disease	7,314 10	
175,000 00	King's Printer	185,633 62	
14,000 00	Marriage licences	18,495 50	
80,000 00	Mental Hospitals	67,624 60	
3,500 00	Notaries Public and Commissioners' fees	2,980 00	
1,300 00	Provincial Home, Kamloops	11,554 43	
3,000 00	Vital statistics, etc.	4,110 97	
350 00	Miscellaneous receipts	2,748 56	
$ 306,630 00			305,375 93
	Department of Public Works:		
$ 27,000 00	Boiler inspections and examination fees	$ 28,135 09	
5,500 00	Electrical energy inspection	2,339 50	
20,000 00	Ferry tolls	12,812 90	
5,000 00	Government property sold	2,193 70	
4,000 00	Wharfage and dock dues	3,054 43	
400 00	Miscellaneous receipts	10,815 81	
$ 61,900 00			59,351 43
	Department of Railways:		
$ 36,000 00	New Westminster Bridge—Tolls	$ 39,152 59	
2,000 00	Miscellaneous receipts	5,491 88	
$ 38,000 00			44,644 47
$ 13,978,245 13	Total Revenue	.....	$ 12,387,687 48

(E.)

(2.)

STATEMENT SHOWING THE EXPENDITURE FOR THE FIRST NINE MONTHS OF THE PRESENT FISCAL YEAR, VIZ., FROM 1ST APRIL TO 31ST DECEMBER, 1920.

Estimated for 12 Months ending 31st March, 1921.	No. of Vote	Service.	Expenditure for 9 Months ended 31st December, 1920.	
		CURRENT ACCOUNT.		
$ 1,838,378 08	1	Public Debt		$1,618,138 31
$ 109,170 00	2	Legislation		190 33
$ 13,880 00	3	Premier's Office		8,805 02
		Department of Agriculture:		
$ 11,380 00	4	Minister's Office	$ 8,201 08	
40,458 00	5	General Office	27,184 86	
91,496 00	6–11	Horticultural Branch	53,687 67	
60,172 00	12	Live Stock Branch	41,637 85	
4,720 00	13	Statistics	2,519 32	
25,960 00	14	District Instructors	15,753 29	
108,550 00	15–34	Miscellaneous Grants, etc.	94,409 03	
.....	.....	Statutory and Special Warrants	1,642 35	
$ 342,736 00				245,035 45
		Department of the Attorney-General:		
$ 11,310 00	35	Attorney-General's Office	$ 9,019 85	
26,040 00	36	General Office	18,627 35	
19,005 00	37	Joint-stock Companies and Insurance Branch	13,306 30	
6,740 00	38	Municipal Branch	5,407 55	
15,372 00	39	Censor of Moving Pictures	8,976 68	
19,180 00	40	Administration of "Prohibition Act"	21,914 80	
28,246 00	41–43	Sheriffs' Offices	18,302 07	
2,840 00	44	Official Guardian, Vancouver	1,802 05	
7,360 00	45	Legal Offices Branch	4,719 87	
222,850 00	46–51	Land Registry Offices	134,332 87	
79,798 00	52–59	Supreme and County Courts	57,616 29	
361,900 00	60	Provincial Police	249,095 12	
85,580 00	61–62	County Gaols	45,436 28	
71,179 00	63–64	Industrial Schools	40,762 18	
38,960 00	65	"Infants Act" and Refuge Home	22,924 54	
24,360 00	66	Public Utilities Commission	5,454 77	
163,000 00	67–78	Miscellaneous Votes	110,527 87	
.....	.....	Statutory	178,759 23	
$ 1,183,720 00				946,985 67
		Department of Education:		
$ 25,342 00	79	General Office	$ 18,625 61	
79,106 00	80	Free Text-book Branch	75,602 99	
30,530 00	81	Agricultural Education	25,687 22	
121,710 00	82	Industrial Education	31,527 49	
62,580 00	83	Inspection of Schools	47,452 83	
75,405 00	84–85	Normal Schools	56,587 74	
40,000 00	86	Deaf, Dumb, and Blind	18,829 25	
1,138,500 00	87–89	*Per Capita* Grants	761,846 70	
514,340 00	90–91	Teachers' Salaries	245,810 95	
320,000 00	92	School Buildings	294,085 31	
37,100 00	93–98	Miscellaneous Votes	30,025 32	
420,000 00	99	University of British Columbia	315,000 00	
.....	.....	Statutory	187,297 93	
$ 2,864,613 00				2,108,379 34
		Department of Finance:		
$ 12,200 00	100	Minister's Office	$ 9,422 35	
32,156 00	101	General Office	24,396 30	
15,825 00	102	Inspector of Trust Companies, Probate and Succession Duties	6,342 95	
51,900 00	103	Controlling and Audit Branch	38,858 54	
113,580 00	104	Surveyor of Taxes	39,392 00	
32,772 00	105	Bureau of Information	5,731 54	
84,450 00	106	Agent-General's Office, London	40,239 11	
$ 342,883 00		*Carried forward*	$ 164,882 79	$4,927,534 12

STATEMENT OF EXPENDITURE FOR THE FIRST NINE MONTHS OF THE PRESENT FISCAL YEAR.—*Continued.*

Estimated for 12 Months ending 31st March, 1921.	No. of Vote.	Service.	Expenditure for 9 Months ended 31st December, 1920.	
		CURRENT ACCOUNT—*Continued.*		
$ 342,883 00	.....	*Brought forward*	$ 164,882 79	$4,927,534 12
		Department of Finance—*Continued.*		
533,222 00	107-149	Government Agents and Assessors, etc.	304,023 58	
6,634 00	150	Operation of "Amusements Tax Act"	3,415 42	
76,840 00	151-155	Miscellaneous Votes	25,818 17	
....	.....	Statutory	3,455 26	
$ 959,579 00				501,595 22
$ 18,090 00	156	Department of Fisheries	.....	13,099 32
$ 28,300 00	157	Department of Industries	....	9,258 97
		Department of Lands:		
$ 12,942 00	158	Minister's Office	$ 9,523 34	
33,224 00	159	General Office (Salaries)	24,378 15	
45,128 00	160	Lands Branch (Salaries)	33,416 39	
75,974 00	161	Survey Branch (Salaries)	47,940 12	
95,812 00	162	Water Rights Branch (Salaries)	62,015 78	
221,410 00	163	Forest Branch (Salaries)	165,413 90	
25,000 00	164	Temporary Assistance (Salaries)	6,126 97	
179,705 00	165	Expenses, General Office and Branches	84,674 44	
635,200 00	166-183	Miscellaneous Votes	311,509 02	
.....	.....	Statutory	76,611 95	
$ 1,324,395 00				821,610 06
		Department of Labour:		
$ 15,540 00	184	General Office	$ 7,742 30	
9,380 00	185	Minimum Wage Board	3,282 56	
72,680 00	186-196	Employment Bureaus	40,619 17	
....	.....	Special Warrants	591 25	
$ 97,600 00				52,235 28
		Department of Mines:		
$ 10,565 00	197	Minister's Office	$ 7,317 81	
19,702 00	198	General Office	15,812 90	
40,600 00	199	Mines Inspection Branch	25,151 65	
16,630 00	200	Bureau of Mines	10,949 38	
17,330 00	201	Mine-rescue and Training Stations	10,102 54	
181,000 00	202-206	Miscellaneous Votes	136,879 10	
89,374 38	.....	Statutory	5,062 53	
....	.....	Special Warrant	15,187 37	
$ 375,201 38				226,463 28
		Department of the Provincial Secretary:		
$ 9,440 00	207	Minister's Office	$ 6,878 41	
14,180 00	208	General Office	9,929 54	
67,030 00	209	Provincial Board of Health	53,365 44	
20,520 00	210	Provincial Library and Archives	14,895 76	
8,100 00	211	"Public Libraries Act"	5,818 05	
10,608 00	212	Provincial Museum	6,390 76	
627,616 00	213-216	Mental Hospitals	445,609 45	
42,945 00	217	Provincial Home, Kamloops	27,904 54	
527,250 00	218-223	Grants to Hospitals and Charities	282,612 85	
189,747 48	224	King's Printer	195,177 63	
15,650 00	225	Civil Service Commission	8,321 04	
480,000 00	226-242	Miscellaneous Votes	264,365 86	
.....	.....	Statutory	93,906 63	
$ 2,013,086 48				1,415,075 96
		Department of Public Works:		
$ 11,040 00	243	Minister's Office	$ 7,419 98	
64,754 00	244	Administration	47,541 89	
127,164 00	245	Parliament Buildings and Grounds	82,333 80	
19,400 00	246	Government House and Grounds	13,894 49	
58,000 00	247	District Engineers	35,086 02	
54,807 00	248	Steam-boiler Inspection	25,691 08	
8,350 00	249	"Electrical Energy Inspection Act"	4,174 39	
8,618 00	250	"Factories Act"	4,994 31	
2,197,600 00	251	Roads, Streets, Bridges, and Wharves	1,517,960 94	
195,490 00	252	Steamboats, Ferries, and Bridge-tenders	94,996 15	
.. ..	.....	Special Warrant	1,338 67	
$ 2,745,223 00				1,835,431 72
.....	.....	*Carried forward*	.....	$9,802,903 93

STATEMENT OF EXPENDITURE FOR THE FIRST NINE MONTHS OF THE PRESENT FISCAL YEAR.—*Continued.*

Estimated for 12 Months ending 31st March, 1921.	No. of Vote.	Service.	Expenditure for 9 months ended 31st December, 1920.	
		CURRENT ACCOUNT—*Continued.*		
....	.....	*Brought forward*	.....	$9,802,903 93
		Department of Railways:		
$ 24,900 00	253	General Office	$ 16,570 10	
25,000 00	254	New Westminster Bridge	45,258 98	
$ 49,900 00				61,829 08
$13,963,871 94		Current expenditures (charged to Income)		$9,864,733 01
		CAPITAL ACCOUNT.		
		(Expenditures out of Income.)		
$ 1,183,761 36	255	Sinking Funds	$ 741,666 58	
907,200 00	256	Pacific Great Eastern Railway Co. (interest on Guaranteed Bonds)	297,241 87	
....	Stat.	"P.G.E. Note Guarantee Act, 1919" (interest)	175,515 55	
9,700 00	257	B.C. House, London, England	4,850 00	
50,000 00	258	Songhees Reserve	16,860 30	
200,000 00	259	Johnson Street Bridge, Victoria	.....	
116,300 00	260	Roads, Streets, Bridges, and Wharves	17,884 75	
250,000 00	261	Industrial School and Boys' Subnormal School Buildings	162,225 61	
100,000 00	262	Government Buildings, Prince Rupert	1,201 96	
18,500 00	263–266	Police Stations and Quarters	1,316 90	
81,000 00	267	Mental Hospital, Essondale	34,585 94	
12,000 00	268	Government Buildings, Pouce Coupe	32 00	
20,000 00	269	Government Buildings, Williams Lake	.....	
3,500 00	270	Purchase of Building, Barkerville	.....	
175,000 00	271	Technical School	167,260 46	
18,000 00	272	Forestry Offices and Rangers' Stations	1,067 27	
5,000 00	273	Warden's Residence, Oakalla Prison Farm	1,805 75	
300,000 00	274	Main Highways, Industrial and Settlement Roads	299,957 87	
.....	Stat.	"Soldiers' Land Act, 1918"	539,691 39	
$ 3,449,961 36		Capital expenditures (charged to Income)		2,463,164 20
$17,413,833 30		Total expenditures (charged to Income)		$ 12,327,897 21

(E.)

(3.)

STATEMENT SHOWING EXPENDITURES AND ADVANCES OUT OF MONEYS RAISED BY LOAN UNDER AUTHORITY OF THE LEGISLATURE FOR SPECIFIC PURPOSES, 1st APRIL TO 31st DECEMBER, 1920.

Authority for Expenditure.	Service.	Expended for 9 Months ended 31st December, 1920.	
	CAPITAL ACCOUNT.		
"B.C. Loan Act, 1916"	Pacific Great Eastern Railway Co	.....	$ 270,000 00
"B.C. Loan Act, 1917"	Land Settlement Board	.....	50,000 00
"B.C. Loan Act, 1919":			
Section 7 (*a*)	Trunk Roads and Bridges	$428,125 92	
Section 7 (*b*)	Land Settlement Board	800,000 00	
Section 7 (*c*)	"Soldiers' Land Act, 1918"	168,139 44	
Section 7 (*d*)	Conservation Fund	225,000 00	
		.....	1,621,265 36
"Better Housing Act, 1919"	Housing Loans	.....	756,250 00
"Department of Industries Act, 1919" ...	Industrial Development Fund	.....	755,000 00
"B.C. Loan Act, 1920":			
Section 7 (*b*)	"Soldiers' Land Act, 1918"	$199,999 54	
Section 7 (*c*)	Conservation Fund	50,000 00	
		.....	249,999 54
"B.C. Highway Loan Act, 1920"	Roads and Bridges	.....	205,593 67
"P.G.E. Construction Loan Act, 1920" ...	Pacific Great Eastern Railway Co	.....	3,974,668 40
"P.G.E. Note Payment Loan Act, 1920" ..	Pacific Great Eastern Railway Co	.....	4,800,000 00
	Total Capital Expenditures (Statutory)	.....	$ 12,682,776 97

PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS

Hon. T. D. PATTULLO
Minister of Lands

REPORT OF OIL SURVEYS

IN THE

PEACE RIVER DISTRICT

1920

BY
JOHN A. DRESSER AND EDMUND M. SPIEKER

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by William H. Cullin, Printer to the King's Most Excellent Majesty.
1921.

VICTORIA, B.C., January 14th, 1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Reports of Oil Surveys in the Peace River District of British Columbia in 1920 by John A. Dresser and Edmund M. Spieker.

T. D. PATTULLO,

Minister of Lands.

Oil Survey in the Peace River District, British Columbia.

By John A. Dresser.

The following is a summary report of progress for the season of 1920 in the investigation of the oil and gas resources of the Peace River District in British Columbia which is being carried on by the authority of the Minister of Lands and under the direction of the Comptroller of Water Rights. The area considered in this report lies north of the Peace River, west of Peace River Block, north-east of the foot-hills of the Rocky Mountains, and south of Graham, or the South-west Branch of the Halfway House. A larger part of the district including this area was made the subject of a reconnaissance examination and report during the season of 1919 by the late Professor Gwillim. In his report Professor Gwillim recommended certain areas for detailed examination, of which the field here considered is one.

The work of the past season was begun as nearly as possible at July 1st and continued to September 15th. In this work the writer had the valued aid as field assistant of Professor Alexander Maclean, of the University of Toronto, who had already had several years' experience in geological investigation in the Cretaceous basin of the great plains in the service of the Geological Survey of Canada. The object of the examination was to define as closely as possible the most promising localities for possible operation within the area recommended in Professor Gwillim's report of last year.

Summary and Conclusions.

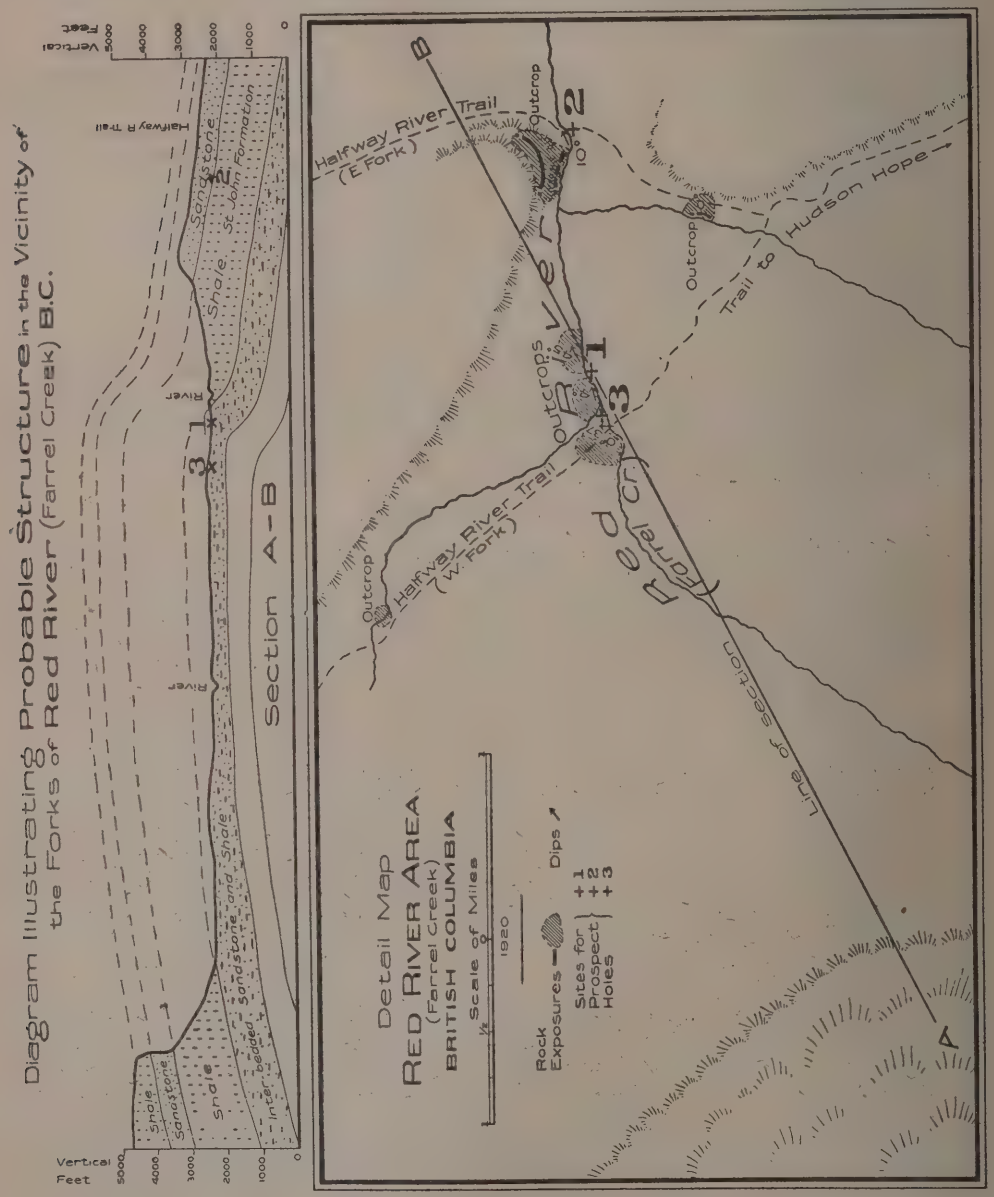
The area as already defined forms a triangle approximately 40 miles from south to north, and 10 or 12 miles wide at the north, the sides practically converging to a point at the Peace River near Hudson Hope. The surface is deeply covered by soil and rock. Exposures are few, which necessitates much work outside of the immediate field. The principal evidences of geologic structure are found along the Peace River in the vicinity of Red River, 20 miles north of Hudson Hope, near the crossing of the trails leading to the Halfway River, and along the South-west Halfway or Graham River.

The underlying rocks of known character are shales and sandstones of Cretaceous age, whose geologic equivalent in some other parts of Western Canada are oil-bearing. The upper portions of these rocks, known as the St. John formation, consist of shales with a less amount of sandstones; a lower part, the Bullhead Mountain formation, is composed of sandstones with a minor amount of shale. These formations are further distinguished by other differences of fossil content, mode of origin, and condition of preservation which it is not necessary to describe for present purposes. Beneath both of these formations rocks of Triassic age probably occur, and though possibly oil-bearing, they are likely to be found only at depths too great to be profitably explored.

The character of the St. John shales strongly suggests that they are oil-bearing, but accumulations of commercial value can only be expected in the porous sandstone-beds within the shales or in the upper parts of the Bullhead sandstones immediately beneath them. Such accumulations are most likely to occur in folds of the rocks, principally in anticlinal or upward folds. Along the Peace River one such fold appears near Hudson Hope and another at the "Gates" of the Peace, 7 miles lower down the river. Other folds, probably related to these, were also found on the Red River near the trail to the South-west Halfway, on Lynx Creek near the trail leading to the forks of the Halfway, and on the South-west Halfway near the trail leading to Hudson Hope. These are the most promising localities for the discovery of oil yet found in the area.

In view of the unlikelihood of finding better structures and of the limited amount of other information likely to be obtained in the area by further field examination alone, it seems advisable that the next step in the search for oil should be made by exploratory drilling. The object of such drilling would be to prove the character of the formation at depth, to ascertain

if there is any accumulation of oil in the porous members, and to better define the structures in which accumulation may occur; in short, the drilling would be done for information rather than for the immediate production of oil. With this object in view certain places were selected while in the field as suitable drilling-sites. Their positions are shown on the accompanying plan and are also marked on the ground by numbered posts. In exploratory drilling especially great care should be taken in collecting, interpreting, and preserving drilling records.



GENERAL DESCRIPTION.

Surface Features.—The area examined is a rolling plain bordering the foot-hills of the Rocky Mountains. Its general altitude is between 2,000 and 3,000 feet above sea-level and only exceeds or falls below these limits at rare intervals. The foot-hills which form the south-west boundary rise quite abruptly and have a well-defined north-westerly course.

In places low broad ridges run more or less continuously in direction parallel to the front of the foot-hills. They are very largely soil-covered and it is not clear how far, if at all, they express the structure of the underlying rocks. In places they appear to do so, as is indicated by their parallelism to the foot-hills, but in other instances they seem to be due to pre-glacial erosion or irregular deposits of glacial material. The highest of these is about 300 feet above the prairie-level.

From the Peace River northwards the general surface rises somewhat uniformly for 25 miles and then appears to decline slightly towards the South-west Halfway. From west to east there is a general decline in altitude as shown by the drainage; Lynx Creek, Red River, Kobes Creek, and their branches are all swift-flowing streams with uniform steep gradients.

The most pronounced topographic features, however, are erosional. Near the trail to Hudson Hope the South-west Halfway flows in a broad erosion valley quite 500 feet below the ridge separating it from Kobes Creek. Kobes Valley, which appears to be influenced by the jutting-out of a spur of the foot-hills, is slightly above the South-west Halfway in altitude.

The three branches of Red River and Lynx Creek in its two branches are cut mainly in unconsolidated clays and sands and in most places run in a narrow V-shaped trench. For instance, at the trail from Hudson Hope to the South-west Halfway, Lynch Creek is 100 feet deep and 800 feet wide between prairie-level on either side without exposing bed-rock. Near its mouth, however, the underlying shales and sandstones are cut by the stream in steep-walled gorges to a depth of 40 or 50 feet, often in courses following the joints of the rock. The same is true of the Red River, the Middle Branch of which is entrenched in sandstones and shales near the Halfway trails.

The descent from prairie-level to the Peace River is made on the Halfway trail over an escarpment of 350 feet at about 2 miles from Hudson Hope, followed by a second bench of 100 feet at the north side of the village, and thence by a further descent of 100 feet down the actual bank of the river to the boat-landing.

GEOLOGY.

General.—The great plains in the latitude of the area under discussion are underlain by sedimentary rocks which were deposited in Cretaceous time. They extend from the vicinity of the Rocky Mountain Divide easterly to the Lower Athabaska River, and have a still greater extent in a north-westerly and south-easterly direction. Towards the eastern margin they rest on strata of Devonian age and near their western border on Triassic measures. The Cretaceous rocks of the region are shales and sandstones. East of the foot-hills of the Rockies they form a broad synclinal basin within which there are minor undulations or small folds.

Local.—The district represented on the accompanying map lies in the western part of the Cretaceous basin, and the rocks, other than surface deposits, belong to the lower part of that system. Two formations must be considered, although only one is actually exposed within the area.

FORMATIONS.

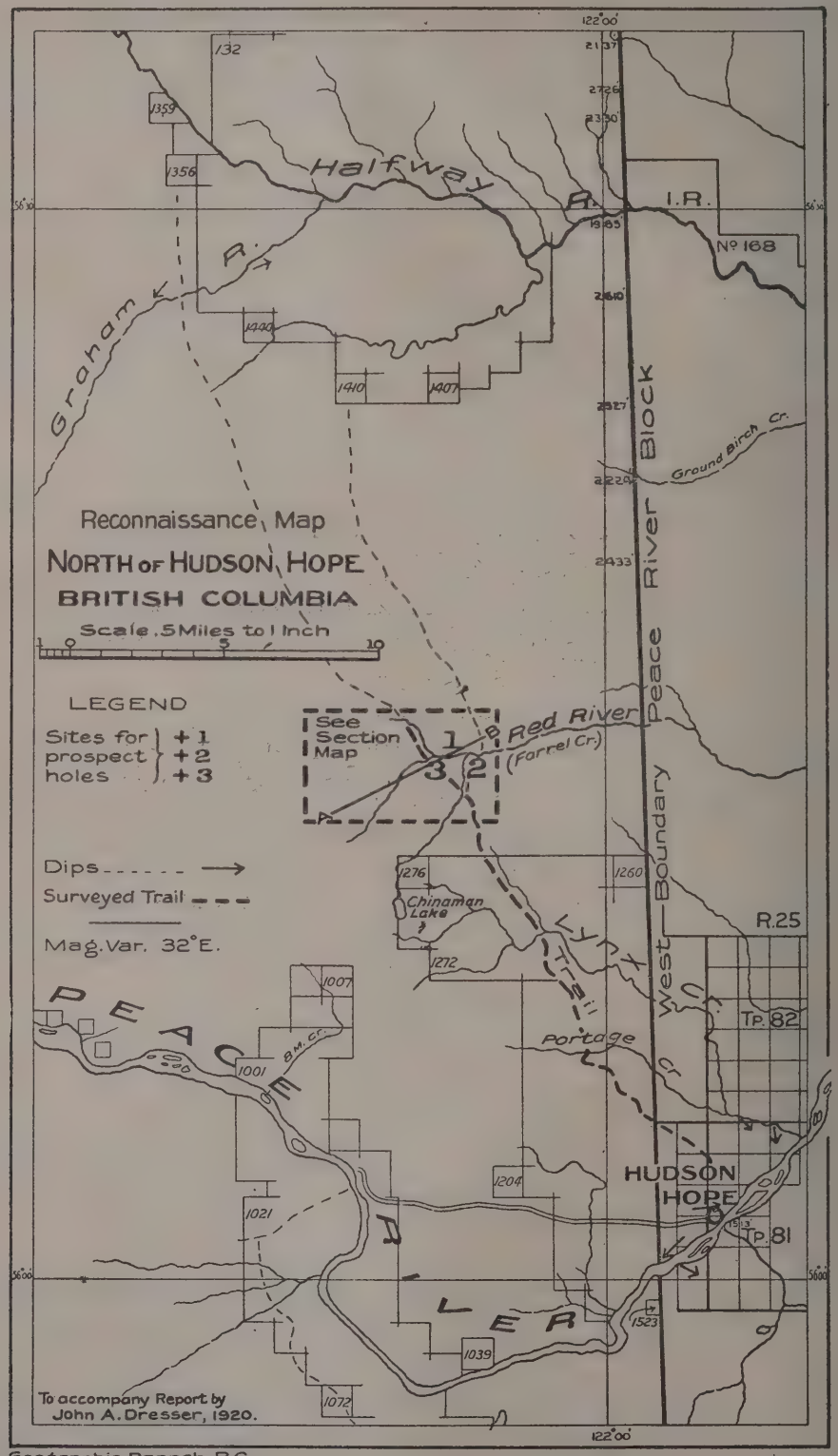
Age.*	Formation.	Character.	Origin.
Cretaceous { Upper (Coloradoan)	St. John	Shales and sandstone	Marine.
Cretaceous { Lower	Bullhead	Sandstone	Terrestrial.

* McLearn, F. H.: Geological Survey of Canada, Summary Report, 1917.

CHARACTER AND EXTENT OF FORMATIONS.

The Bullhead formation is exposed only in the uplifted strata of the foot-hills which form the western boundary of the area. It is a grey compact sandstone considerably indurated where folded. In places it contains seams of coal. It is a thick formation possibly several thousand feet in depth.

The St. John formation underlies the entire area. It consists of shales and sandstones in places somewhat calcareous. No fossils were found in either. The St. John shales vary in colour from dark grey to rusty red, and at a short distance commonly present a purplish hue. They are soft and very fissile, easily splitting into thin laminæ. A lump crushed and rolled in the hand


Halfway R.
Graham R.
I.R. No 168
Peace River Block
West Boundary
Ground Birch Cr.
Red River
(Farrel Cr.)
Chinaman Lake
Portage
PEACE R.
HUDSON HOPE
Tp. 82
Tp. 81
R.25
Reconnaissance Map
NORTH of HUDSON HOPE
BRITISH COLUMBIA
Scale .5 Miles to 1 Inch
LEGEND
Sites for prospect holes +1 +2 +3
See Section Map
Dips
Surveyed Trail
Mag. Var. 32°E.
To accompany Report by John A. Dresser, 1920.
Geographic Branch, B.C.

frequently gives a petroleum odour. The St. John sandstone is a grey friable rock of rather fine even grain. In places the cementing material appears to be calcareous in the thinner beds. Beds vary in thickness from 20 or 30 feet to 1 or 2 inches. The shales form much the greater part of the formation, but in some horizons, apparently in the lower part of the formation, the sandstone approximates the shale in amount.

F. H. McLearn, of the Geological Survey of Canada, from an extensive study of the series, estimates the thickness of the formation to be upwards of 2,200 feet, consisting of an upper shale of 1,300 feet and lower of 800 feet separated by some 50 to 80 feet of sandstone. (Summary Report, 1917, Geological Survey of Canada.)

STRUCTURE.

In the foot-hills which form the west boundary of the area the rocks are folded, in places sharply, into north-westerly running ridges which frequently rise as much as 1,000 feet above the adjacent plain on the east. In this disturbed belt the St. John formation, where not removed by erosion, wraps closely over the underlying Bullhead, apparently in comformable succession. This is well shown on the south end of Portage Mountain.

East of the disturbed belt or foot-hills the dip is towards the north-east, generally at low angles, except where reversed by occasional folds. Two broad anticlines appear in the banks of the Peace River in the first 15 miles east of the foot-hills. The first is near Hudson Hope and the second at the "Gates" of the Peace, a rock-enclosed narrows some 7 miles east of Hudson Hope. In these the dip, which elsewhere is commonly less than 5°, rises very perceptibly on both limbs of the folds. In both there are strong beds of sandstone, indicating the middle horizon of the St. John formation.

Along the river-bank the rocks are largely concealed between these folds. The localities where they are exposed on the Peace River are both within the Peace River Block, about 2 and 9 miles from its west boundary. They trend towards the north-west and doubtless extend beyond this boundary into the soil-covered area.

On Lynx Creek, about a mile from its junction with the Peace, there is a sharp fold giving a south-westerly dip of 45°. Shales predominate here, but sandstone is also present. The exposure is small and the fold may be local. This, too, is within the Peace River Block.

In going northward from the Peace River west of the Block, shale-beds appear in the banks of Lynx Creek a mile or more east of the trail leading to the South-west Halfway. The exposure is small and the altitude of the beds cannot be safely determined.

Between the first and second Red Rivers some 20 miles north of Hudson Hope there are several exposures (*see* plan). From the crossing of the east trail to the South-west Halfway an escarpment about 100 feet high borders the river for a distance of a quarter of a mile westward. The rocks are largely sandstone, but there are a few minor beds of shale and the whole appears to rest on shale at the base. The dip is quite uniformly N. 20° to 25° E. (magnetic) at an angle of 10°. A mile west of this locality shale in a low exposure on the river has a dip of 45° in direction N. 20° E. (magnetic). Some 1,800 feet westerly are several exposures in the vicinity of the crossing of the west trail and the second Red River. In these the rocks are thin-bedded sandstone and shale in about equal amounts. They are nearly horizontal, though there is usually a slight dip towards the north-east.

Northwards from this locality no rock was found, except a small exposure a mile south of Graveyard Prairie on the north-east side of the third Red River, and on a spur of the foot-hills near Kobes Creek, until the South-west Halfway is reached, at a distance of some 20 miles. On this river, for several miles above its junction with the main Halfway, sandstones and shales in rather thick beds dip uniformly down the stream at a low angle of 4° or 5°. Near the crossing of the trail from Hudson Hope the rocks are concealed by soil along the river-banks, but appear in hillsides on the north side of the river. Crossing a break of a mile in this escarpment the rocks reappear on the west, dipping in the opposite direction towards the foot-hills, at about the same angle. There thus appears to be a broad anticline here having its axis in the vicinity of the trail from Hudson Hope to Cypress Creek and northward. This may be a continuation or repetition of one of the folds found on the Peace River, but, of course, the broad concealed interval between the localities makes any definite determination quite impossible. The lithological character of the formation in having sandstone nearly or quite equal in amount to shale suggests that the three localities—viz., South-west Halfway, Red River, and Peace River—may be about the horizon of the middle sandstone defined by McLearn. But in the absence of fossils and the

scarcity of other evidences this conclusion, though quite possible, is as yet little more than conjectural. Small fractures are found in one or two folds, but only such as would be naturally sealed by the compression of the shales.

Oil-seepages are reported in several localities. All such indications were examined that were reported as visible at the time of our examination, but were found to be due to other materials.

ECONOMIC CONSIDERATIONS.

In composition, and, as far as can be learned by surface examination, in structure also, the St. John formation is favourable for the occurrence of oil and gas. It has large and slightly disturbed beds of marine shales, and these are interbedded with considerable bodies of porous sandstone. Such folds as are known are not accompanied by great faults or dislocations. Other similarly favourable structures are liable to occur beneath the great mantle of drift that conceals so much of the area.

Also, the entire area examined may be regarded as only a small sample of the wide region occupied by this formation. It therefore seems advisable that this area should next be tested, by drilling, as to the actual occurrence of oil within the sandstones at depth. These are the natural places for accumulations of oil to take place, whether in the sandstones of the St. John formation or, possibly, in favourable portions of the immediately underlying Bullhead.

Such drilling, with its results carefully scrutinized and recorded, would be highly valuable, not only in giving information as to the presence of oil in the sandstone actually drilled, but also in disclosing the nature, depth, and all contents of value in the formations concerned. Such data are of greater importance in view of the large extent of this formation in the region.

TIMBER.

The country is generally wooded, though patches of open prairie of a mile or two in extent are common. Poplar, cottonwood, white birch, spruce, and jack-pine are the common trees. These grow to sizes suitable for fuel, lumber, small building, or drilling operations. A sawmill is badly needed in the district. Prairie-grass grows abundantly in the open spaces, generally affording ample feed for horses on the trail.

LABOUR AND SUPPLIES.

For operations requiring any considerable amount of labour men must be brought from outside. A few pack-trains and outfits for wagon or sleigh transport, with good packers, may be engaged at Hudson Hope, also several good guides. But the population is small and there are few unemployed men. Ordinary living supplies and common implements can be purchased at Hudson Hope.

TRANSPORTATION.

Except for a wagon-road across the Rocky Mountain Portage and for a few miles along the Peace, the only means of overland transport in the district in summer is by pack-trains over saddle-trails. This is of necessity slow and expensive. The nearest railway communication is reached at Peace River Crossing, or Spirit River, on the Edmonton, Dunvegan & British Columbia Railway, or at Prince George on the Grand Trunk Pacific Railway. The last route is little used except the district in summer, when advantage is taken of the down-stream course of nearly 300 miles on the Peace and the Parsnip and its tributaries. The most common route in summer is by way of the Peace River, either to Peace River, 240 miles by boat, or to Dunvegan, 170 miles by boat, and some 15 miles by road to Spirit River Station. Automobiles and auto-trucks are used on this road. In winter there is travel by sleigh on the river to the same points and also by an overland route via Pouce Coupe to Spirit River. In summer this route is still impossible for wagons between Moberly Lake and Pouce Coupe for a distance of 100 miles or more.

The Peace is a strong swift-flowing river with frequently changing bars and a wide range in the depth of water. Consequently, it is difficult to get draught for boats of sufficient power to stem the currents. A rate of $4.50 per 100 lb. is quoted by freighters between Spirit River and Hudson Hope for winter traffic, and $3 per hundredweight by boats in summer. All shipments, at least in winter, must be arranged for by specific order. Mail from Hudson Hope is conveyed by boat or trail to Fort St. John, and thence overland to Pouce Coupe, twenty-five times per year. There is also a Government telegraph-office at Hudson Hope which greatly facilitates outside communication.

The Geology and Oil Resources of the Foot-hills South of Peace River in North-eastern British Columbia.

By Edmund M. Spieker.

Introduction.

The attention of those interested in the development of the world's oil resources has in recent years been turned with some keenness of anticipation towards the region of moderately folded rocks between the foot-hills of the Canadian Rocky Mountains and the plains. In the effort to ascertain the promise of the area at least two prominent oil companies have had parts of it examined in geologic reconnaissance. That part of the belt which lies in British Columbia has appeared worthy of study. In his report to the Department of Lands, Professor J. C. Gwillim* recommended the furtherance of geologic work to determine more exactly the possibilities of the area, and the work on which this report is based was done in fulfilment of that recommendation.

The object of the writer's work was to determine as completely as possible in the time available the degree of promise as a possible oilfield offered by the region in British Columbia fronting the foot-hills of the Rocky Mountains between the Peace River in the general longitude of Hudson Hope and the Murray (East Pine) River in the latitude of Flat Creek. (*See* map for location of area.) This it was planned to accomplish through a general geologic reconnaissance, supplemented by detailed work in localities which the general examination showed worthy of further attention.

The field-work was done by the writer, assisted by W. R. Smith, during the summer of 1920. Unprecedented weather conditions delayed progress materially, cutting in half the amount of time in which observations could be made, and it was not possible to complete all of the work planned; however, a reconnaissance map of the entire area was made, and such detailed work as extremes of unfavourable weather would allow was done on the Pine River at Boulder Creek and about Hudson Hope.

Acknowledgments.

The writer wishes to express his sincere appreciation of the assistance given by many with whom he came into contact during the progress of the work. Acknowledgment is due Dr. F. H. McLearn, of the Geological Survey of Canada, for advice and criticism given in the field and office; to Professor Edward W. Berry, of the Johns Hopkins University, for the determination of fossil plants and for general criticism; to Dr. T. W. Stanton, of the United States Geological Survey, for advice concerning the invertebrates collected; to the Geological Department of Johns Hopkins University for facilities accorded during the preparation of the report; and to A. R. Barrow, B.C.L.S., for the loan of instruments in the field to replace some of those spoiled in an accident. Special acknowledgment of the perfect service given by H. C. Garbitt, packer, and Bert Meikle, cook, of the writer's party, is due; without the efficiency and willingness of these men much of the work could not have been done. The generosity of many of the residents of Hudson Hope, and in particular Charles Paquette, facilitated work materially. And as a word of final acknowledgment the writer desires to express full appreciation of the cordiality and goodwill with which every convenience for carrying on the work was accorded by the Department of Lands.

The Map.

Beyond those areas directly adjacent to surveyed land-lines no mapping of much worth has been done in the region, and in order to locate approximately such natural features as are important to a geologic study a pace traverse was carried along all of the routes taken by the writer's party. In the area north of the twentieth base-line the traverse was checked as frequently as possible on land corners, whereas to the south of the Pine River, in the region with no accurately

* Gwillim, J. C.: Report Oil Survey, Peace River District, B.C. Dept. Lands, Victoria, 1919.

located surveys, the writer's traverse was carried in loop form, and was checked on the land survey from which it started.

Numerous difficulties attend the making of an accurate map in rough and forested country. However, the experience of explorers has shown that corrections to pace traverses intelligently made fall well within an allowable percentage of error, and for the purpose of this work the method was chosen in preference to the making of astronomic determination of position, which involves the disadvantage of having to carry delicate chronometers by pack-travel, and offers little, if any, advantage in accuracy in the form available to geologic workers.

The accompanying map was prepared by the addition of the writer's traverses to those maps of the area which existed prior to this work.

LOCATION AND GENERAL CHARACTER OF THE REGION.

As the accompanying map shows, the region described in this report lies to the south of the Peace River, extending as a belt 10 to 40 miles wide from Hudson Hope south-easterly to the Murray River at the mouth of Flat Creek. This area forms physiographically a transition zone between the more abrupt foot-hills and the gently rolling plains; the topography is varied, and in places sharply sloped hills break the rolling nature of the terrane, although as a whole the marked roughness of surface of the true foot-hills is absent.

The region is drained by the Peace River and its tributaries. The portion drained more or less directly by the Peace is small, extending from Hudson Hope to the divide north of Moberly Lake. Adjoining this to the south is a belt occupied by the Moberly River and its tributaries; this, too, is small, being about 10 miles wide and extending the width of the belt in an east-west direction. The major portion of the area is drained by the Pine River system, the three main branches of which have cut deep valleys across it.

The Peace River occupies a valley about 800 feet deep, which in the vicinity of Hudson Hope is from 2 to 3 miles wide. The upper levels of land adjacent to the valley are more or less flat-lying, but 7 miles to the south hills break the evenness of the plateau, and from the general neighbourhood of Moberly Lake south-eastward along the entire area the topography is broken by hills and the dissection of the Pine River drainage.

The valley of Moberly River, which is occupied south of Hudson Hope by Moberly Lake, varies from 1 to 2½ miles in width. In the region studied its valley is U-shaped, with many flats and a meandering stream-bed. It offers no serious difficulty to travel; roads might be cut along it at a minimum of expense.

The Pine River flows from Falls Creek to the mouth of Wabi Creek in a deep, U-shaped valley which was undoubtedly the pre-glacial course of the stream. Below Wabi Creek the present bed of the river is post-glacial, the extensive morainic deposits thereabout having deflected its waters south-eastward to cut the existing V-shaped gorge through the St. John shales. The old course of the Pine is now occupied by Wabi Creek; it is a broad valley filled with glacial material, in which are many kettles and lakes of glacial origin, and it is clearly discernible from the hills west of Wabi Creek as the course formerly followed by the Pine directly north-eastward to the Peace. At the Middle Forks the Pine enters the pre-glacial course of the Sukunka River.

The Sukunka River is the central member of the Pine River system. Locally it is known as the "Middle Pine" River, the name "Sukunka" not having been adopted by the few residents of the region, but for purposes of clearness it will be referred to in this report as the Sukunka River. It is somewhat larger in volume of water than the Pine River. Its valley varies in width from 1 to 3 miles in its lower part and does not narrow materially as far as can be seen from the hills at the mouth of Burnt River. For a distance of about 22 miles from its mouth the valley is heavily forested with poplar, willow, and spruce. Above this stretch the timber has been burned, leaving the country bare and open as far as the bend above the mouth of Burnt River.

The Murray (East Pine) River is the easternmost and largest of the three main branches of Pine River. The matter of its nomenclature is similar to that of the Sukunka; the inhabitants of the region know it as the "East Pine" or "East Fork," and reference among them to the Murray River conveys no intelligence. However, to avoid the confusion attendant upon the modification of the word "Pine" to refer to distinct streams, the writer will use the name "Murray."

The valley of the Murray differs somewhat from those of the Sukunka and Pine. Physiographically it is infantile, having long stretches of V-shaped channel, with almost continuous cut-banks of shale and sandstone forming its sides, and in places the stream flows in a true box canyon. The Murray presents a profusion of rock-exposures at the river's edge throughout its length in the area, whereas the other rivers named, occupying more mature valleys, show few cut-banks and expose the more resistant beds only in the upper reaches of their valley-sides. The Murray Valley is heavily timbered, but there, as in most other parts of the area, the timber is small and has accordingly no present commercial value.

The two larger lakes in the area, Moberly Lake and Rocky Mountain Lake, are of common origin, each having been formed through the damming of its parent stream by glacial material. In each case the localization of the morainic material was undoubtedly determined by the presence at the surface of the resistant sandstones of the Dunvegan formation. The main bodies of these two lakes, and of Moose Lake as well, occupy beds cut in the St. John shales, but at the east ends of the lakes the overlying Dunvegan formation is brought to water-level by east dips, and its presence there undoubtedly determined the placing of the dams which caused the lakes. It is interesting that the geologic conditions surrounding these lakes are identical.

The entire area is generally well forested with young spruce, pine, poplar, willow, and alder. Localities which are not largely forest are rare. As a rule the northern banks of the rivers have less vegetation, particularly of the forest type, than the southern banks. This is due to the closeness of balance between precipitation and dissipation of moisture; the greater amount of sunshine which reaches the northern valley-sides is sufficient to carry away just the amount of water needed to make up the minimum for forest-growth, and since the shaded southern exposures retain this amount they support trees, whereas in many cases the northern banks are bare.

With the exception of a few localities on the Pine River, there is little or no timber of commercial value in the area. Above Peavine Flat on the Pine River are flats on which spruce as large as 30 inches in diameter is growing. Elsewhere, with the possible exception of a small area on the divide between Marten Creek and Rocky Mountain Lake, the writer observed no timber of commercial value.

Stratigraphy.

The formations exposed in the region fronting the Rocky Mountains of Northern British Columbia embrace a series of sedimentary rocks ranging in age from Triassic to Upper Cretaceous. A general review of the entire series is given in the following table of formations:—

Table of Formations.

System.	Group	Formation.	Character.	Thickness (in Feet).
Upper Cretaceous	Montana	Wapiti.....	Subaerial sandstones, massive, cross-bedded, with shales and lignite	900+ (top not exposed).
	Colorado	Smoky River	Dark, friable shales, marine, with median sandstone member	800
		Sukunka member	Coarse subaerial sandstones, hardened continental muds, green shales, lignite	1,000+
		Dunvegan.....	Massive to thin-bedded sandstones, varying in origin from littoral to subaerial, with some shale and few thin seams of lignite	1,000+
		St. John...	Black marine shales, usually arenaceous, with intercalated sandstone-bands and marine sandstone locally	1,400-2,200

Table of Formations—Continued.

System.	Group.	Formation.	Character.	Thickness (in Feet).
Lower Cretaceous (?)	(?)	Bullhead Mountain	Hard green-grey conglomerates, coarse-grained, massive sandstones, and shales with many seams of high-grade coal	1,500–3,000
Jurassic (?)		Pine River.....	Blue-black marine shales with intercalated limestones and some sandstone	300+ (base not exposed).
Triassic	.....	.....	Purple limestones and fine-grained sandstones; limestones vesicular near top	As yet unknown.

The Wapiti and Smoky River formations are not recognizable in the area described in this report; they are found in the broad syncline of the plains to the east, and may occupy the upper hillsides just east of the Murray River, at the eastern edge of the area. Since their importance for the purposes of this work is small discussion of them will be omitted.

The preliminary results of work on the development of this section on the Peace and Smoky Rivers by Dr. F. H. McLearn will be found in Part C of the Summary Reports of the Geological Survey of Canada for 1917 and 1918.

Triassic.—Rocks of Triassic age do not outcrop in the area here described, but inasmuch as they would probably be penetrated by a borehole on the Pine River anticline, some mention of such information as exists concerning them is pertinent.

On the Peace River, above the Rocky Mountain Portage, McLearn* has found the Triassic series to consist of dark-purple limestones and hardened, fine-grained sandstones with *Pseudomonotis subcircularis* Gabb, and many ammonites. These beds are probably all of marine origin. The series is thick; at the time of submitting this report a definite figure is not available, but it is known to be measurable in thousands of feet. The sandstones of the Peace River section are firmly cemented with calcium carbonate, and their general appearance does not indicate that they might make good reservoir rock. However, in the area here considered the series has undergone less metamorphism than on the Peace, and in addition there is the chance that the sandstones may be more open.

The limestones of the Peace River section are vesicular in the upper part of the formation, the cavities having a length of from 1 to 3 inches and being spaced about a foot apart. It is not known at the time of writing whether the vesicularity is the result of dolomitization or not, but its presence on the Peace hints at the possibility of cavernous structure elsewhere, and although the observed data make possible no predictions as far as the area here considered is involved, they leave more open the possibility of reservoir rock beneath the Pine River anticline.

Pine River Formation.—This formation is the lowest of the series exposed within the area examined. It occurs at the surface on the crest of the Pine River anticline, being exposed in the narrow valley of Pass Creek for a distance of about 4 miles above its mouth. It consists chiefly of firm blue-black clay shales, the lowest observable beds of which are remarkably pure, being almost entirely free from sand and presenting the appearance of a hardened, uncontaminated black clay. In this respect it differs from most other marine black shales of the general region, which are almost uniformly sandy. Interspersed with the shales are bands of limestone and sandstone in thicknesses from a few inches up to 20 feet or more; the limestone is very compact and hard, steel-grey on fresh fracture, and, varying with changes in purity, weathers into shapes ranging from angular to gnarled or rounded in outline. The colour of its weathered surface is a greyish-yellow. No fossils were found in the limestone at any of the exposures visited by the writer.

* McLearn, F. H.: Personal communication.

The section of the Pine River formation exposed in Pass Creek is as follows, beginning at the top:—

Thickness (in Feet).	Character of Beds.
200	Sandstones of Bullhead Mountain formation.
20–30	Concealed (shale ?).
10±	Limestone, hard, grey, siliceous.
65	Shale, blue-black, marine, pure, in which are intercalated bands of limestone 8 inches to a foot thick separated uniformly by about 4 feet of shale.
20+	Limestone, massive, hard, blue-grey on fracture, weathers dirty yellow, forms cliff.
40±	Shale, black, hard, hackly in large proportion, marine.
3	Limestone, weathers into gnarled shapes, blue-grey on fracture.
3	Sandstone and limestone alternating, layers prominent, weathers into flat surface.
3	Shale of same composition as others, but breaking to angular fragments with more or less plane surfaces.
5/6	Limestone, very siliceous, hard, weathers into angular surface of yellow-grey colour; is steel-grey on fresh fracture.
2 3/4	Shale, black, hard, hackly.
5	Limestone, with 6-inch median parting of shale; hard, steel-grey on fresh fracture, appears pure, weathers yellowish-grey.
100±	Shale, blue-black, firm, pure, hackly in large proportion, contains very few fossils.

Since the upper part only of the formation is exposed an estimate of its thickness is impossible. It was planned to examine the upper valley of the Moberly River in a search for more extensive exposures which might yeld a section more nearly complete, but field-work was stopped by unusual weather before this could be begun. Information concerning the downward extent of these shales, therefore, and their relation to the Triassic limestones is not available.

Prior to the writer's work the existence of the Pine River formation was unknown. Its age is not certain; since in Pass Creek it contains very few fossils, a statement concerning its time position cannot bear much weight. However, three fossil forms, a species each of *Pinna*, *Pecten* (?), and *Lima* (?), which were found after considerable search, indicate, according to Dr. T. W. Stanton and Dr. J. B. Reeside, Jr., of the United States Geological Survey, the broad possibility that the beds are Jurassic in age. Further study of these beds will prove of great interest in the matter of their relationship to the prominent development of the Jurassic in Alaska and to the Fernie shales farther south in British Columbia.

Bullhead Mountain Formation.—The section west of Hudson Hope on the Peace River discloses beneath the St. John shales a thick series of coarse sandstones and shales of continental origin which have been described by McLearn* as the Bullhead Mountain formation. On the Peace River the upper part of the formation consists of sandstones and shales, with many seams of high-grade coal, and the lower part consists of massive, coarse-grained, cross-bedded sandstones. The total thickness there is about 3,000 feet.

The formation is exposed in the area here considered on Pine River east of Pass Creek, where the upturning series brings it high into the valley-sides on the east flank of the Pine River anticline, and at the mouth of Boulder Creek, where the contact with the overlying St. John shales is approximately 300 feet above the level of Pine River on the crest of the Boulder Creek fold. At the latter locality the upper 200 feet of the formation are well exposed in the canyon of Boulder Creek.

The upper member of the Bullhead Mountain formation has been called by the writer, for purposes of reference, the Boulder Creek conglomerate. It is well exposed in the canyon below the falls in Boulder Creek. There it consists of about 130 feet of extremely hard, resistant conglomerate, the pebbles of which are almost uniformly ⅛ to ¼ inch in diameter, and which consist of flint, chert, and quartz. They are firmly bound by a silica cement. A green chert, which appears to have been stained by glauconite, is prominent as a rule, and inasmuch as it does not exist in any of the clastic rocks above the Bullhead Mountain, it is interesting as a means of identification of the rock, as well as an index to changes in the continental mass to the west as a result of whose disintegration the Cretaceous clastic rocks were formed.

* McLearn, F. H.: Peace River Section, Geol. Surv. Can., Summ. Rept., 1917, Pt. C, p. 16.

The pebbles are as a rule well rounded and have been well sorted into a very compact mass, which with the firm silica cement forms a rock more resistant than any other known to the writer in North-west Canada. It forms cliffs, the weathering of which, having been much slower then that of the surrounding rocks, stand out prominently wherever the bed is exposed. The cliffs have disintegrated into huge boulders, the striking array of which in the canyon of Boulder Creek suggested the name of the stream.

The conglomerate is characteristic in appearance, its distinct mineral content and habit making it lithologically the most easily recognized of any of the Cretaceous series of the region. Pebbles and small boulders of it are found in all of the larger stream-beds of the area, and although it is clear in some places that they have been transported there by glacial agents, their widespread occurrence gives evidence of the great lateral extent of the formation.

Below the Boulder Creek conglomerate are sandstones which decrease gradually in hardness for a vertical distance of 600 feet. Below these sandstones is another massive bed which was seen at a distance in the Upper Pine Valley; this may also be conglomerate. Below that bed less massive sandstones and possibly shales with coal occupy the remaining 600 feet to the top of the Pine River formation. The entire thickness of the formation is contained in the hill east of Pass Creek and north of the Pine River, but none of it is exposed save the massive members mentioned, the remainder being covered by the soil and the dense sub-arctic vegetation. Information given by H. C. Garbitt, who was the writer's packer, indicates the presence of coals in the creek whose headwaters abut on those of Pass Creek, and an inference drawn from the disposition of the beds in the general region suggests that the coals are probably in the middle or lower part of the Bullhead Mountain formation.

St. John Formation.—The Bullhead Mountain series is followed in upward succession by the St. John formation, which embodies 1,400 to 2,200 feet of blue-black to grey shales with intercalated sandstone members. On the Peace the formation is divisible into three members—an upper shale member 1,300 feet thick, a sandstone 80 feet thick, and a lower shale member 800 feet thick. The upper member consists of typical marine black shales, with little or no sandstone, but the lower member contains many small thicknesses of sandstone. The Peace River section has been described by Dr. F. H. McLearn.*

The St. John shales are distributed in outcrop over the entire area. They form the valley-sides of the Peace River in the vicinity of Hudson Hope. To the south, in the hills north of Moberly Lake, the overlying Dunvegan sandstones form the surface, but in the valley of Moberly River the shales reappear. They outcrop in the valleys of the Pine River, the Sukunka (above Marten Creek), and the Murray River; on Tyskoola and Table Mountains; and in the area south-west of Rocky Mountain Lake, the shales forming the lower valley-sides as a rule, and the Dunvegan sandstones capping the ridges. In the area south of the Peace River the lower part of the formation contains many irregular sandstone members, and the differentiation of the middle member of the Peace section is not clear.

All known exposures which reveal the contact between the St. John shales and the Dunvegan formation show a gradual transition from beds of distinctly marine origin to continental sandstones and shales with lignite and plant impressions. In Paquette Creek, on the north shore of Moberly Lake, the following section was measured at the top of the St. John formation:—

Formation.	Character.	Thickness (in Feet).
Dunvegan	Sandstone, fine-grained at bottom, increasing in coarseness of grain to top	200
Transition zone	Sandstone and shale, predominantly sandstone	22
	Shale and sandstone, predominantly shale	16
	Shale, black, sandy, with concretions of sandstone and ironstone	18
	Sandstone, massive, fine-grained, grey	1
	Shale as above	20
	Sandstone, platy, with shale intercalations	1
St. John	Shale, black, sandy in places, with limestone concretions and bits of comminuted plant remains	80
	Creek-bottom.	

* McLearn, F. H.: Peace River Section, Geol. Surv. Can., Summ. Rept., 1917, Pt. C.

A transition similar to this was noted wherever the contact between the two formations was observed. The upper part of the formation is exposed in the vicinity of Moberly Lake, in the narrow valleys of the creeks tributary to the lake, and in the lower valley of Miller Creek. There it consists of marine shales, arenaceous as a rule, varying in character from fissile to hackly, and locally calcareous. On the Pine River the upper shales are not frequently exposed, the hillsides being covered with vegetation, but such occurrences as were noted revealed at least 500 feet of shale with no important sandstone members. In the area south-east of the Middle Fork the upper shales of the formation are entirely similar.

The lower part of the formation consists of a series of alternating shales and sandstones at all exposures seen by the writer. A typical section of this part of the formation is exposed in the valley of Boulder Creek above the falls. It is as follows:—

Formation.	Character.	Thickness (in Feet).
St. John	Sandstone, massive, yellow-grey	70±
	Shale, black, marine, thin-bedded, arenaceous, with even lines of ironstone concretions and thin bands of sandstone	550±
	Sandstone, massive, medium-grained	25
	Sandstone, soft, friable, with carbonaceous matter	2
	Shale, black, sandy	3
	Lignite-seam	1
	Shale, sandy, with bands of carbonaceous matter approaching lignite in composition	35
	Sandstone, continental in origin, soft, friable, containing carbonaceous matter and leaf impressions	20
Bullhead Mountain	Conglomerates of Bullhead Mountain formation	130

On the northern escarpment of Tuskoola Mountain is exposed a series of shales and sandstones which have been determined tentatively, chiefly on the basis of fossil evidence, as the upper part of the St. John formation. The areal relationship of these beds to the Dunvegan-Sukunka series on the Sukunka River is not entirely clear, and will remain an open question until the region between Elephant Mountain and the Sukunka River has been examined in some detail. Circumstances prevented such an examination during the course of this work. Something of the nature of a distinct downfold or fault must exist in this area to carry the Dunvegan from its elevation of about 4,500 feet on Tuskoola Mountain to the elevation of about 2,000 feet on the Sukunka River, at which the St. John-Dunvegan contact is dipping beneath the surface, and inasmuch as such structure is not at all evident in any exposures seen, the relationships on the Sukunka suggesting rather that the Dunvegan series were dipping under the shales of Tuskoola Mountain, it was thought at first that the series on Tuskoola Mountain must represent higher horizons. But fossils collected indicate in general facies that the shales of Tuskoola Mountain are probably of the same age as the St. John formation, and until further areal evidence is obtained they must be regarded as such. The shales in Table Mountain, which is separated from Tuskoola Mountain by the broad valley of Lone Prairie, are undoubtedly St. John in age, but the extreme paucity of exposures on Lone Prairie makes their correlation with the Tuskoola Mountain beds a matter of question. However, despite the fact that they might dip under Tuskoola Mountain, and thus place the shales there as an upper series, it is much more rational to suppose them to continue their nearly horizontal attitude and to occupy the same general horizon as the beds in Tuskoola Mountain.

The section exposed in Tuskoola Mountain, beginning with the uppermost beds, is as follows:—

Section on Tuskoola Mountain.

Formation-	Character.	Thickness (in Feet).
Dunvegan	Sandstones, forming the peak of Tuskoola Mountain; very thin-bedded at top, more massive below; ripple-marked, with rootlet markings	100
	Sandstone, shaly, hard, apparently somewhat calcareous, with ironstone concretions and band of pure sandstone; poorly exposed	25
	Softer sandstones, not visible in detail	110±
	Sandstone, hard, massive, forms sharp cliff; grades laterally to softer, pillow-weathering sandstone. Forms top of main mass of east end of mountain. Contains oysters at top and beds of stream-laid conglomerate, 2 to 5 feet thick, pebbles up to ½ inch	50
	Softer sandstones, concealed for the most part, with intermittently massive ledge in middle	240±
	Sandstone, massive	50±
St. John	Softer sandstones, fine-grained, grey to yellow, with ferruginous lentils containing many pelecypods, gastropods, and few ammonites	330±
	Shale, dark, hackly to irregular, with ferruginous concretions and bands of argillaceous grey sandstone	25
	Sandstone, massive, fine-grained, grey	12
	Sandstone, as preceding, but softer	5
	Sandstone, massive to platy, grey	70
	Sandstone, non-marine, concretionary, with sandstone nodules 3 feet in diameter merging into another with no bedding-planes, very irregular, grey, fine-grained.	7
	Marine sandstone similar to those above	10
	Shale, grey, sandy, rectangular fracture-planes	10
	Sandstone, hard, dark grey	6
	Dark marine shales with limestone concretion bands, most concretions flat	175
	Sandstone, massive, hard, yellow-grey	30
	Shale, dark marine	20
	Harder shale, very arenaceous, with irregular bedding-planes, grades to pure sandstone below	40
	Dark marine shales, base not exposed	400±

Fossils collected in the vicinity of the mouth of Fish Creek on the Murray River support the areal determination that the shales there are coeval with the Tuskoola Mountain shales. In the canyon of Gordon Creek there are no marine sandstones at the top of the St. John, the conglomerate and oyster-beds of the Tuskoola Mountain section being followed directly in downward succession by pure marine shale. The shales of Gordon Creek are traceable along the valleys of Murray River and Fish Creek to Rocky Mountain Lake, and thence to the south-easternmost part of the area, on Flat Creek. The essential characteristics of the formation are constant over this area.

The thickness of the St. John formation is about 1,400 feet on the Pine River. In the valley of the Murray River between the crest of the Canyon anticline and the mouth of the Wolverine River, where the only other nearly complete section of the formation is exposed, 1,500 feet were measured without reaching the base of the shales. There is thus a decrease in thickness from the Peace southward and westward; this is without doubt due to a westward replacement of the upper shale horizons by the continental beds of the Dunvegan formation.

Dunvegan Formation.—Directly overlying the marine shales of the St. John formation is a series of sandstones and continental shales named by Dawson the Dunvegan formation and studied recently by McLearn.* These beds, which for the most part are moderately resistant to weathering agencies, form the main body of most of the hills in the area, extending in surface outcrop along the belt of moderate folding for the entire length of the region under consideration, and forming the upper reaches of all the prominent hills save those at the edge of the disturbed belt, where the older formations have been brought up by the folding.

In the vicinity of Moberly Lake the lower beds of the Dunvegan formation form the upper reaches of the range of hills extending south-easterly from Hudson Hope to the Pine River.

* McLearn, F. H.: Peace River Section, Geol. Surv. Can., Summ. Rept, 1917, Pt. C, p. 18. Also McLearn, F. H.: Cretaceous, Lower Smoky River, Geol. Surv. Can., Summ. Rept., 1918, Pt. C.

These beds are more or less heterogeneous in composition and origin. At the contact with the underlying St. John formation there is a true gradation between marine shale and continental sandstone, the marine beds below passing conformably into brackish- and fresh-water argillaceous sandstones, with fresh-water limestone in places. On the south shore of Moberly Lake two thin seams of lignite occur 45 and 65 feet above the base of the formation. Occasional lentils of hard limestone, as well as some sandy layers, contain a few fresh-water gastropods and pelecypods. These beds are succeeded above by subaerial sandstones, for the most part coarse-grained, massive, and cross-bedded, containing leaf fragments whose disposition gives clear evidence of non-aqueous distribution of the materials.

This series of sandstones, with irregular lateral variation from continental to shore facies, extends in the higher elevations from Moberly Lake to the Middle Forks, where its base is approximately 150 feet above river-level, and a thickness of 600 feet, more or less, is irregularly exposed in the hill north of the fork. From this point south, in the valley of the Sukunka, the south-west dip carries the series under, and at 7-Mile Creek, where the base of the formation is estimated to be at least 1,000 feet beneath the surface, the facies changes from the sandstones typical of the Dunvegan as developed to the north to a series of continental green shales, hardened calcareous muds, and grey, platy, cross-bedded, lenticular sandstones with flat nodules of black shales and occasional shaly layers. These beds are undoubtedly continental in origin. They contain seams of carbonaceous material and some low-grade coal.

The complete change in lithologic characteristics presented by these beds affords reason for their consideration as a separate unit, and to meet the needs of his field terminology the writer called them the Sukunka beds. At present they may perhaps be included with the Dunvegan as an upper member of that formation, but future detailed work may reveal the necessity for their adoption as a separate formational unit. They may represent the westward phase of the Lower Smoky River formation.

The thickness of the Sukunka beds is not known, their upper reaches not having been seen in detail by the writer, but their apparent continuation up the Sukunka River from 7-Mile Creek to the synclinal axis beyond Marten Creek shows a thickness estimated at 1,000 feet or more. The valley-sides here are well clothed with soil and grassy vegetation, and since the harder, cliff-making members of the series are the only ones which appear a detailed examination of the beds was not possible.

The Sukunka beds appear also in the canyon of a small creek at the south-west corner of Rocky Mountain Lake. Here they consist of massive sandstone layers 5 feet thick, granular grey-brown shales 2 to 4 feet thick, thin layers of micaceous grey sandstone breaking to feather-shaped fragments, hard, green-grey shales weathering brown, hackly to fissile, paper-thin black shales in thicknesses up to 2 feet, and thin-bedded sandstones. The beds at this locality are estimated to extend possibly 100 feet higher stratigraphically than the section examined in 7-Mile Creek.

At this locality, as well as in 7-Mile Creek, five species of fossil plants were found. These have been determined by Professor Edward W. Berry, of the Johns Hopkins University, as follows: *Anemia fremonti* Knowlton; *Dryopteris coloradoensis* Knowlton; *Populus* cf. *elegans* Lesquereux; *Pterophyllum* sp. nov.; *Podozamites* sp.

Of these the *Anemia* and *Dryopteris* are common in the Frontier formation of the western interior of the United States; the *Populus* is a typical Dakota species, and the other two are older types, the *Pterophyllum* not being known elsewhere in beds above the basal Upper Cretaceous, and the *Podozamites* being an older form which survived in limited numbers as late as the Senonian (Montana group of western interior). The forms thus present two things which are of interest in the development of stratigraphic knowledge in the Canadian North-west: First, evidence additional to that afforded by invertebrate faunas from the Peace River area which points more clearly at each new discovery to the Colorado age of the series; and, second, further evidence of an interesting vertical persistence in North-western North America of certain floras which to the south and elsewhere occur at earlier horizons, and representatives of which are found in Alaska in beds as young as Tertiary in age.

The Dunvegan proper—i.e., the series underlying the Sukunka beds—yielded the following plant species: *Protophyllum lecontianum* Lesquereux; *Platanus latior subintegrefolia* (Lesq.) Knowlton; *Menispermites reniformis* Dawson (?); *Aspidophyllum trilobatum* Lesquereux; *Cycadites unjiga* Dawson; *Platanus* sp.; *Taxodium* sp.

The general aspect of this assemblage is Dakota rather than Colorado, and its occurrence in the Dunvegan formation, which has been shown rather definitely to be Colorado in age, presents more evidence of the persistence of many Dakota forms. The *Menispermites* and the *Cycadites* are typical Dunvegan species, the former having been collected by the writer and others in previous work, and the latter having been found by Dawson in his exploration of the Peace River district in 1879.* The *Aspidophyllum* is identical with the form described as *Protophyllum* by Dawson.

The Dunvegan series increases materially in thickness south of the Peace in the region between Hudson Hope and Moose Lake; the change from 530 feet at Cache Creek to upwards of 2,000 feet on the Sukunka (including the Sukunka series) is marked. If the whole series is found to be more or less coeval with the Dunvegan of Peace River, there was a basin in which deposition of sediments was much more rapid than to the north. However, further work may show parts of the thick series to represent overlapping of either the St. John or Smoky River periods, or both, by the Dunvegan type of sedimentation, and it is not improbable that the Sukunka beds may represent the westward extension of the deposits laid down in early Smoky River time.

GEOLOGY AS APPLIED TO OIL AND GAS.

The geologic conditions which control the accumulation in commercial quantity of oil and gas have been presented in reports similar to this so often of late that no stress need be laid on their discussion here. For the purposes of application to the data under review they may be grouped into four general heads:—

(1.) The occurrence of rocks in which petroleum could have originated.

(2.) The presence near the "mother-rock" of a porous rock which might act as a reservoir.

(3.) The presence of a relatively impervious cover or "cap-rock."

(4.) The disposition of such a series in structural form which would trap the oil, effecting its accumulation.

The first three of these concern the rocks themselves in their sequence, and, applying their principle to the foregoing stratigraphic data, three general parts of the column are seen to fulfil the requirements. In consideration of these, however, it must be understood that actual evidence of petroleum has not been found in any part of the series within the area, and that all consideration of the promise offered by the formations discussed is made with the lack of this sort of *prima facie* evidence in mind.

The Triassic limestones and sandstones offer a possibility. They are not distinctly petroliferous at any of the exposures thus far known, but they may well have yielded petroleum in places, and inasmuch as they probably lie within reach of a drill on the Pine River anticline they must be mentioned as a possible source of oil.

The Pine River shales may be oil-bearing. In exposure they give no evidence of petroleum, but they are of the sedimentary type which gives most promise, and inasmuch as such oil might have been formed in them could have found reservoirs in the neighbouring sandstones, or, possibly, the limestones of the section, they are worthy of a test if it is decided to prove the resources of the area.

The St. John shales offer the most nearly ideal conditions that could exist in the absence of definite evidence of petroleum itself. A series of from 1,400 to 2,000 feet of shales with intercalated sandstone members from a foot or so to 80 or 100 feet in thickness, they present a fulfilment of stratigraphic conditions for the origin and accumulation of petroleum perhaps more complete than that of any other member of the series, and in those places wherein structural disposition of the shales has afforded opportunity for petroleum to collect they are worthy of consideration.

STRUCTURE.

The fourth consideration named above concerns the structure. The geologic structure of the belt fronting the foot-hills of North-west Canada consists of a series of moderate undulations of the strata, the crests of the folds lying in the main parallel to the axis of the Rocky Mountain chain, and the continuity of many single structures being remarkable. The folds are nearly all open—i.e., the beds have not been compressed to the extreme—and many of them are of dimensions and conformation ideal to the retention of any oil and gas which might have existed in the rocks they embrace beneath the surface.

* Dawson, G. M.: Geol. Surv. Canada, Report for 1879, p. 120B.

The region between the western limit of the area and the mountains proper is known geologically as the Disturbed Belt. Within its confines the rocks have been folded and faulted to high degree, the forces which built up the Rocky Mountains having reacted on them with great intensity on account of their proximity to the region of great thrusting. To the east and south-east the effect of these huge forces was absorbed gradually until in the region which now forms the plains the strata underwent no displacement from their natural horizontal position. The belt considered in this report lies between these two extreme areas, and there, although the full strength of the forces had been partially dissipated, enough pressure due to the thrusting penetrated the local rocks to cause ordinarily unbroken flexures of comparatively gentle slope. The structures occur along two to three principal lines of folding, and although it is not possible to trace the continuity of more than one of the anticlines in the area over great length, those which exist are seen to lie along definite lines. The sharpness of the folding decreases regularly from west to east.

In the region under consideration the structures are not as well defined along the lines of folding as are those to the south-east in the Alberta foot-hills. In the region between the Brazeau River and the Wapiti River the open, unbroken folds that characterize the belt are traceable as distinct entities for considerable distances along the general strike of the belt; there is but slight deviation from the direction of the lines of structural weakness, which are parallel with remarkable consistency to the strike of the Rocky Mountain chain. In the area here reported on some differences occur.

Some continuity of structural lines is observable in the southern half of the area; the folds between Flat Creek and Rocky Mountain Lake are apparently more or less true to the mountain-front type existing in Alberta, but from the general region of the Sukunka anticline north-westward marked variations from the north-westerly strike of the rocks occur with some frequency. These irregularities are probably due to adjustment between the forces acting along lines of tectonic weakness which differ in direction to the north and south. Clear evidence of this change is seen in the abrupt bending to the north of the eastern limit of the Disturbed Belt in the region between Pine River and the Peace.

ANTICLINES THAT MAY CONTAIN OIL AND GAS.

A determination of the possibilities for oil and gas requires for its completion in the large a consideration of those points at which the stratigraphically hopeful formations mentioned above lie within drilling depth on the anticlines of the area, and in the interest of conciseness it may be best to incorporate such evidence into the description of the structures.

The major anticlines of the area, in the order of their distance from Hudson Hope, are as follows: Hudson Hope anticline; Moberly Lake anticline; Miller Creek anticlines; Pine River anticline; Boulder Creek dome; Table Mountain anticline; Sukunka anticline; Rocky Mountain Lake-Moose Lake-Flat Creek anticline; Canyon anticline; Bullmoose Creek anticline.

Hudson Hope Anticline.—The Hudson Hope fold occurs entirely within the Peace River Block; that consideration, in addition to the fact that it is hardly pronounced enough to afford an ideal reservoir, prompts the omission here of its detailed discussion.

Moberly Lake Anticline.—The Moberly Lake structure, too, occurs within the Peace River Block at all points conveniently accessible to drilling equipment, and although it presents geologically favourable conditions its discussion would lack point in this report.

Miller Creek Anticlines.—The Miller Creek anticlines are the most easily accessible of all the structures. The northernmost major fold crosses Miller Creek 4 miles from its mouth, and is about 30 miles by trail from Hudson Hope. On its east flank the dips are moderate, ranging from 2° to 8°, but the west flank plunges sharply, having a maximum observed dip of 62°, and flexing upward again in a rather acute syncline whose axis is not farther than one-quarter mile from the crest of the fold. The St. John shales outcrop at the axis of this anticline, and the sandstones in the lower part of that formation are estimated to be from 1,000 to 1,200 feet below the surface on Miller Creek. This anticline is followed by one to the south which is not so steeply folded, the dips of its flanks averaging about 8°. Beyond are several minor undulations which are not of sufficient prominence to warrant their consideration here.

The conformation of the first anticline mentioned forbids its consideration as an ideal structure, and inasmuch as others of the region excel it in most essential characteristics, it may be dismissed with the statement that although it may offer promise in the future, in face of

better economic conditions, its present consideration must be limited in view of the great difficulties that will attend exploratory drilling in the region. The second structure is better formed than the first, and if the locality is to be tested it will merit the first attempt; however, it is apparently local in nature and the area of its flanks is too small.

The Pine River Anticline.—The Pine River anticline, as reference to the map will show, is a pronounced structure of some magnitude. On its east flank the dips attain a maximum of 25° in the hills east of Pass Creek, and decrease gradually in steepness to Peavine Flat, where the beds are horizontally disposed. On the west flank dips as high as 60° occur. The fold is thus distinctly asymmetric, the west flank being the steeper. Its degree of sharpness is somewhat higher than that of an ideal mountain-front oil structure, but the large areal extent of its flanks and their apparent freedom from sharp changes in degree of dip place it among those structures which are to be classed as hopeful. A difficulty which as yet clouds the way to entirely intelligent prospecting lies in the lack of information concerning the section beneath it; inasmuch as the lowest beds seen by the writer outcrop on its crest in Pass Creek, nothing is known as to the thickness and type of the beds which a drill on it would penetrate. The apparent absence of the Pine River shales in the Peace River section observed by McLearn* makes it difficult to presume what might be expected to underlie the fold, but it is probable that the upper limits of the Triassic limestones lie within 1,000 feet of the surface, and if future work should show this to be the case the structure will afford a very good opportunity to test the Triassic as well as the unknown lower part of the Pine River formation.

The Boulder Creek Dome.—The Boulder Creek dome occurs along the same general line of folding as that found on Miller Creek. Its outlines are exposed in the rude crosscut into the rocks by the Pine River, Boulder Creek, and Goodrich Creek, and inspection of the outcrops presented there shows the fold to have a roughly elliptical form, the long axis extending in a direction a few degrees west of north, and the dips being steeper on the north side. The existence of the structure has undoubtedly determined the location of Boulder and Goodrich Creeks; hence its almost perfect quadrisection by the three drainage-channels.

The top of the Bullhead Mountain formation is about 300 feet above the level of the Pine River at the apex of the fold, and the underlying section consists accordingly of approximately 1,200 feet of the sandstones, shales, and coals of the Bullhead formation, with the Pine River shales and limestones below. The possibility of oil-bearing horizons below the Bullhead Mountain formation, coupled with the dome-like shape of the structure, presents a geologically attractive situation as far as oil and gas are concerned, and inasmuch as no other locality of the area appeared as promising as did this, the writer planned to study the structure in detail for the purpose of making a drilling location. Such work as was possible in the weather of September was done and a location was made.

The Boulder Creek structure promises most of all the folds in the area for the following reasons:—

(1.) Its dome-like shape makes it almost perfect as a reservoir structure.

(2.) It is underlain within 1,300 feet of the surface by the lower sandstones of the Bullhead Mountain formation and the upper shales and limestones of the Pine River formation, a series of at least 300 feet in thickness, and probably more, which may contain petroleum.

(3.) The extremely hard Boulder Creek member of the Bullhead Mountain formation has been cut away by erosion at the apex of the dome; the amount of hard rock to be penetrated in order to reach the lower section is less than it would be elsewhere.

The Table Mountain Anticline.—This fold occurs on a structural line which is probably the extension of that on which the Moberly Lake anticline lies, and which is apparently the outermost of the axes of distinct plication. Its crest appears to have the usual north-west and south-east direction and it crosses the Pine River near the eastern end of Table Mountain. It is not a pronounced structure; the dips on the east flank are at most 3°, and on the west flank the average dip is approximately the same, although on a structural terrace visible in the eastern end of the hill north of the Middle Forks west dips as high as 10° are measurable over a short distance.

The Table Mountain anticline is in conformation well worthy of consideration as a possible reservoir of oil, but it has the disadvantage of embracing beneath the surface and within reach of a drill too limited a section of possibly petroliferous rocks. The St. John shales outcrop at

* McLearn, F. H.: Personal communication.

its crest. In the Pine River Valley, where a drilling location would be most advisable in the interest of accessibility, depth of worth-while drilling, and general economy of prospecting, the top of the St. John shales is at least 1,000 feet above river-level. The total thickness of the St. John shales is not known exactly in this locality, but it is not likely to be much different from the 1,400 feet measured on the Pine at Boulder Creek, and a simple subtraction shows at once that the thickness of hopeful strata below the surface is probably not more than 400 feet. Below that lies the 1,500 feet or more of the Bullhead Mountain formation, in the main body of which no oil need be expected. A prediction concerning the possibilities in beds below these is not entirely safe; the Pine River shales may be present at a depth of from 1,900 to 2,200 feet, but since nothing is known as to their lateral persistence to the east it is not possible to make a valuable estimate of the chances in deep drilling on the Table Mountain fold. A borehole on the Boulder Creek dome would yield information which might throw considerable light on this question, and, at all events, if it is desired to test the Pine River formation the Boulder Creek locality far excels any other in point of drilling depth, amount of hard rock to be penetrated, and degree of sureness of the presence of the formation underground.

The Table Mountain anticline should, in view of these limitations, be held in abeyance as a possibility whose investigation will be well worth while if oil is discovered elsewhere in either the Lower St. John shales or the Pine River formation.

Remaining Folds in Southern Part of Area.—The folds south of the Pine River are at present so difficult of access that their consideration may in the interest of space be brief.

The structure along the Sukunka Valley is synclinal for about 10 miles above its mouth. The first major anticline observable occurs near the mouth of Brush Creek; it is mapped as the Sukunka anticline. Its relation to the other structures of the area is not entirely clear. Its crest probably follows the north-westerly trend of the belt, but this is by no means certain. Extreme irregularities of strike on its flanks make it impossible to define its contour without detailed work involving far more time than that available to the writer, and its inaccessibility discouraged giving it more attention than that possible in reconnaissance. It may form the rim of the wide synclinal basin south of the Pine River, and as such may be continuous with the Boulder Creek-Miller Creek fold-line to the north and the Rocky Mountain Lake fold-line to the south, but its local irregularities reduce such a consideration to the status of an assumption.

As a possible oil-container the Sukunka anticline may be worthy of attention if other parts of the region prove productive; its conformation is good, dips on the east flank ranging from 5° to 10° in the vicinity of the crest and on the west flank from 15° to 40°, and the strata consisting of St. John shale and sandstone to a probable depth of 800 feet. However, a well-location on this fold should not be made except after a study in great detail of the general locality, for its obvious irregularity of contour suggests strongly the presence of structural conditions which must be known as well as possible if the location is to be wisely placed.

The longest apparently continuous fold in the area occurs between Rocky Mountain Lake and Flat Creek. Its presence has been observed by the writer at the forks of Flat Creek, 18 miles from the Murray River; at the mouth of Flat Creek; on Bullmoose Creek near its mouth and 2 miles up-stream; at the west end of Moose Lake and at the west end of Rocky Mountain Lake. Although nothing is known of its presence between these localities, their alignment indicates the strong possibility of its continuity. This long fold, which for clearness may be called the Flat Creek anticline, is flexed moderately at most of the points which have been observed, and is accordingly worthy of consideration as a possible reservoir structure.

At its exposures in the valleys of Flat Creek, the Murray River, and Bullmoose Creek, the fold embraces beneath the surface a limited thickness of the St. John shales and the full thickness of the Bullhead Mountain formation. It brings to the surface at its crest the lowest beds known in this part of the area, and in consequence an accurate estimate of the strata which would be penetrated by a drill is not feasible; however, it is likely that the top of the Bullhead Mountain formation is not far beneath the surface in the general vicinity of the Murray River, and that accordingly the value of the structure in terms of present knowledge is questionable.

The most favourable localities, geologically considered, on this fold are those at the western ends of Rocky Mountain and Moose Lakes, where the underlying strata consist of nearly the entire thickness of the St. John shales. Of these the Moose Lake locality is possibly the better on account of its lack of structural irregularity.

It was planned to determine approximately the amount and direction of plunge of structures such as this, but the accidental destruction of the writer's instrumental equipment made it impossible to obtain the elevations necessary to derive such data. However, results of visual observation, despite the fact that they are often misleading, indicate that the Flat Creek fold probably plunges to the south-east from Moose Lake to Flat Creek forks, and that to the north-west from Moose Lake there is probably little variation in the elevation of the crest, the plunge, if any, being to the north-west.

The extreme inaccessibility of this structure places it in the class of those which will be worthy of attention if the region is shown elsewhere to be productive.

About 6 miles below the mouth of Flat Creek a fold which has been called the Canyon anticline crosses the valley of the Murray River. In degree of flexure it is less pronounced than the Flat Creek fold, which succeeds it to the south-west, but it is clearly defined, the dips on the east flank being in the general neighbourhood of 9° and on the west flank between 7° and 15°. It probably dies out to the north-west, and to the south-west its extension is not certain, although a fold which may be integral with it occurs in the valley of the East Fork of Flat Creek about 3 miles above the forks of the creek. Its contour on the Murray River is favourable to the storing of oil, and inasmuch as the major portion of the St. John shales probably underlies the surface at its crest, it is worthy of note geologically, but it is at present too difficult of access to be considered on economic grounds.

A pronounced fold of almost symmetrical proportion occurs in the hills west of Bullmoose Creek in the vicinity of the trail from Moose Lake to the Wolverine River. It is indicated on the map as the Bullmoose Creek anticline. North-west and south-east of this locality the structure along the line of the fold is much broken up and really forms the outer edge of the Disturbed Belt, but at the locality mentioned a somewhat hurried examination revealed no extreme contortion of the strata. At some point along the crest of the fold and in the general vicinity of the trail mentioned a test would be advisable in the existence of some sort of transportation facility, but the great cost of exploratory drilling at so great a distance from existing lines of freight-travel precludes active interest in the structure for some time to come. It is probable that at least half of the St. John formation underlies the surface at the apex of the fold.

Minor Folds.—The flanks of the major structures mentioned above are, in some places where the dip is low, flexed slightly into minor folds of local extent. These smaller structures should not be considered as places for preliminary tests of the region, but inasmuch as certain of them include beneath the surface the most attractive formations of the series, they may well be considered briefly in view of their possible importance should oil be discovered in commercial quantities on one of the larger folds.

Several minor undulations occur in the valley of Miller Creek. Their location and degree of flexure are indicated on the map. One north of the main Miller Creek folds includes the major part of the St. John shales beneath its crest, and those to the south include the entire thickness of these shales with part of the overlying Dunvegan formation.

Reversals of dip, indicating a small local "roll" in the structure, occurs in 7-Mile Creek, in the Sukunka drainage area. This fold embraces in sub-surface formation the lower half of the Dunvegan formation and the underlying St. John shales, and consequently may merit attention if these formations are found to contain oil.

Another minor fold exists in the narrow valley of Fish Creek near its mouth. This is perhaps the most interesting of the minor folds observed, since its flanks are steep enough to give it a pronounced character, and the section underlying it embodies the most promising part of the St. John shales. The dips on its flanks near the crest vary from 4° to 6°.

Close examination of the smaller stream-courses will probably reveal the presence of other such structures in regions where the attitude of the beds is nearly horizontal. However, consideration of these minor folds must be tempered by a weighing of the probability of their persistence in depth. It is frequently true that smaller warpings of strata such as these die out in depth, and locations on them, should any prove advisable, should be made with allowance for that fact in mind. The persistence of the structures above noted may be assumed with safety to be sufficient to ensure a reservoir within shallow depths, but, depending on the character of the underlying formations, it is not policy to expect results from drilling on local upwarps. If the surface strata are harder than those in which oil is sought the structure may well continue

to some depth, and may even grow more pronounced; but if the rocks below are harder they may not have yielded to the pressure which folded the softer strata, and the anticline may not exist below.

Indications of Petroleum and Gas.

No unquestionable seepages of petroleum were observed by the writer, and none have been noticed by any of a number of residents who were questioned.

The only well-established seepages known in this part of British Columbia occur about 45 miles east of the eastern limit of the area examined. One of these, for whose existence the writer can vouch, occurs on the Pouce Coupe River east of Rolla, B.C., and the other, whose general location was made known to the writer by E. Mast, of Rolla, in 1919, exists on Moose Creek about 4 miles north of its mouth on the Peace. These seepages occur at a horizon which is probably at the top of the Dunvegan sandstone. They offer no direct encouragement to prospective development in the area covered by this report, but they indicate that petroleum does exist at places in the series.

The writer observed a thin film of oil on the surface of water in an old well east of Hudson Hope on the homestead of Joseph Lemieux, to whom thanks are due for calling attention to the occurrence. The well penetrates the St. John shales to a distance of about 15 feet. It was not possible to collect any of the oil, and proof of its composition is hence not offerable.

Thin films of some sort of oil were noticed on the water of the Pine River east of Pass Creek. The film did not have the brilliant iridescence peculiar to petroleum, and inasmuch as the quantities were much too small to permit the collection of a sample the value of its evidence is small; furthermore, the point at which the oil was noticed is so far from the nearest outcrop of country-rock that its source is at best very inexactly determinable.

A seepage of gas was found on the west flank of the Boulder Creek dome, at the base of the cliff of Boulder Creek conglomerate, and north-west of the drilling location. The gas bubbles up intermittently through water in a hole at the base of a tree. The roots of the tree have undoubtedly afforded a channel through which the gas may escape from the underlying sandstone to the surface. The gas is highly inflammable and contains a considerable percentage of hydrogen sulphide. When it is burned the odour of sulphur dioxide is strong.

Transportation.

At present the region is accessible via three routes of travel, one from the west and two from the east. The western route, from Fort George via the Giscome Portage, Crooked River, and the Parsnip River to the peace, is a water route, and is preferred by some prospectors, travellers, and engineers for comparatively light travel. It is not a good route for the transportation of heavy equipment. The routes from the east leave the end of steel on the Edmonton, Dunvegan & British Columbia Railway at Peace River Crossing and Spirit River or Grande Prairie respectively. The first of these is the most used and is the best for the transportation of all classes of freight; it makes use of the Peace River, which is navigable by vessels of light draught between Fort Vermilion and Hudson Hope. The season for navigation on the stretch between Peace River Crossing and Hudson Hope embraces the months of June, July, and August as a rule, and in some years the large steamer makes the trip in September. Smaller craft ply the river as late as the first formation of ice.

The third route mentioned is a land route. From the railway points of Spirit River and Grande Prairie wagon-trails lead to Pouce Coupe, whence a more or less passable wagon-trail leads to the Pine River at the mouth of the Murray, at the eastern edge of the area in question. The trail from Spirit River to Pouce Coupe is not used in summer on account of muskeg: it is a winter trail, and is used chiefly by the farmers of the Pouce Coupe Prairie for the haulage of their grain to the railroad. The road from Grande Prairie to Pouce Coupe is by far the better; it is passable to automobiles in dry weather and is extensively used for freighting into the Pouce Coupe District.

West of the Pine River at the mouth of the Murray travel by wagon would involve much road-cutting. A road is supposed to exist as far as Hudson Hope, but it is not used by teams, and it is not likely that a wagon could make the trip without much road-building work.

Within the area travel is nearly all by pack-train in summer, and by sleigh in winter. Wagon-roads exist about Hudson Hope and on Lone Prairie, but they are of local importance only, and most of them would not suffice in their present state for the haulage of heavy freight.

The transportation of equipment from the end of steel to any of the localities at which drilling might be contemplated would involve the cutting and grading of road if the materials were to be hauled in summer. In winter the frozen rivers offer roadways to sleighs when the ice is favourable, and the problem of present-day transportation of drilling materials to the region must not be considered without examining the possibilities of winter travel.

General Considerations.

With the main facts concerning the stratigraphy, structure, and economic features of the region in hand, a brief summation of their application in general concerning the prospects for oil may be worth while. A conclusion regarding the advisability of attempting exploration with the drill must naturally be based on a balancing against one another of the favourable and unfavourable facts (not opinions) which have been gathered. Without attempt at the differentiation of geologic from economic data, these facts may be summed up as follows:—

Unfavourable Factors.

(1.) Absence of evidence through seepage or other appearance of the presence of petroleum in the rocks.

(2.) The great cost of transporting drilling equipment to any of the advisable locations.

(3.) In corollary to the preceding, the expense attached to the disposal of such petroleum as might be found.

Favourable Factors.

(1.) The presence of a number of formations in which oil could occur.

(2.) The presence of anticlines which dispose the possibly oil-bearing strata favourably to the retention of petroleum.

(3.) The comparatively reasonable depth within which the beds to be tested may be reached.

A balance of these facts against one another is not easy. No matter with what accuracy the information concerning their details is obtained, the measure of probabilities inevitably to be drawn in makes an unqualified conclusion difficult to reach. However, as far as the geologic factors are concerned, it is possible to arrive at a conclusion as to the advisability of further exploration, and although the dictates of such evidence must be qualified by the consideration of economic problems incident to development, a review of all the factors will tend to make the situation clearer.

Of the unfavourable factors, the first may or may not tell the whole story. Vast oilfields, to-day yielding millions of dollars in petroleum, exist without a single surface indication within their limits. Oil-seepages would offer in their presence a decidedly encouraging circumstance, but their absence need not be entirely unfavourable if other features of the rocks involved contribute no negative evidence. And this condition exists in the area considered.

The second and third of the unfavourable factors, those involving expense, are difficult of calculation through lack of precedent. Inasmuch as there is no freight traffic to those points at which drilling equipment would be necessary, no transportation rates exist. They might be approximated roughly, however, if drilling were considered, from rates existing elsewhere in the north.

All three of the favourable factors indicate possibilities. They offer positive evidence only in so far as they do not deny the possibility of an oilfield within the area. But the facts that oil could have originated in the rocks considered, and that it could have accumulated at the points mentioned as favourable, point toward a possibility, the degree of whose suggestion would certainly be strong enough to have attracted investment in drilling operations long ago if transportation were less difficult and cheaper. If the oil resources of North-west Canada are to be proven, these factors show clearly that the area must not be slighted.

If, then, the presence of oil there is to be ascertained, the data given in this report will serve as a guide to exploratory drilling. Transportation difficulties, which at present are the chief obstacles to unqualified recommendation of the area, might well be solved, and if oil were found a railroad, long in contemplation, might be called into active existence before the time which would normally see its presence.

As a whole the region may be classed on the basis of geologic evidence as a fair prospect. If transportation of materials can be arranged satisfactorily to the interests of drilling operations, tests should be made on the structures which can best be reached. Proof of the evidence of petroleum in commercial quantity must rest on the results of intelligently placed drilling; the value of geologic evidence in the case lies in its statement of either the presence of petroleum or the likelihood of its presence, and of the points at which such petroleum might have accumulated. In the region examined the likelihood cannot be denied (although the actual presence of oil is not proven) and the structures are known. All else depends upon the drill.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

Reconnaissance Map
showing
Geology & Structure
of a portion of
PEACE RIVER DISTRICT
BRITISH COLUMBIA

to accompany report by
Edmund M. Spieker
1920

Scale of Miles
0 5 10 15

Department of Lands
Hon. T. D. Pattullo, Minister.

LEGEND

Geologic Formation.
- Dunvegan. D
- St. John. SJ
- Bullhead Mtn. PBM
- Pine River. PR

Structure.
- Anticlinal Axes.
- Synclinal
- Strike and Dip.
- Dip only.
- Trails.

Geology of areas not shown hachured in moderately folded belt, not known.
Surveyed land, lines solid
Formation boundaries approximate

Geographic Division, B.C.

RETURN

Of Moneys received and paid by the Official Administrators of the Province as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

JOHN HART,
Minister of Finance.

Treasury, February 14th, 1921.

ATLIN MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF PETER PETERSON.

1920.			
April 26.	To Commission, O.A.	$	18 50

ESTATE OF CHARLES L. QUEEN.

1920.			
Jan. 22.	To Commission, O.A.	$	35 95
	Probate duty		49 17
	Harris, Bull & Mason		100 15
July 20.	F. C. Underhill, survey		204 00
Dec. 31.	J. A. Fraser, refund		20 00

ESTATE OF PATRICK KENNEDY.

1920.			
Jan. 2.	To R. Kennedy, refund	$	193 16
Dec. 28.	" "		117 50

ESTATE OF FREDERICK W. MARCUS.

1920.			
July 9.	To Refunds, Official Administ'r	$	40 00
Aug. 26.	Commission, D.M. of F.		7 50

ESTATE OF AXEL SWANSON.

1920.			
Aug. 26.	To Commission, D.M. of F.	$	5 80

ESTATE OF CHARLES PETITT.

1920.			
Aug. 26.	To Fisher & Oughton, letters of administration	$	23 20
Aug. 30.	Commission, D.M. of F.		11 15

ESTATE OF THADEE OBALSKI.

1920.			
July 19.	To Corporation of West Vancouver, taxes	$	10 41

CR.

ESTATE OF PETER PETERSON.

1920.			
Jan. 22.	By Deposit	$	345 10

ESTATE OF CHARLES L. QUEEN.

1920.			
Jan. 22.	By Deposit	$	558 17

ESTATE OF PATRICK KENNEDY.

1920.			
April 21.	By Deposit	$	976 76

ESTATE OF FREDERICK W. MARCUS.

1920.			
Aug. 26.	By Deposit	$	150 00

ESTATE OF AXEL SWANSON.

1920.			
Aug. 26.	By Deposit	$	106 10

ESTATE OF CHARLES PETITT.

1920.			
Aug. 26.	By Deposit	$	195 75

ESTATE OF DAN SULLIVAN.

1920.			
Dec. 29.	By Deposit	$	150 00

J. A. FRASER,
Official Administrator.

CARIBOO ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF WILLIAM BARNIE.

1920.			
Aug. 26.	To Registrar, County Court	$	292 96
	Deputy Minister of Finance		27 19
Oct. 2.	E. J. Avison		70 05
Oct. 11.	Deputy Minister of Finance		86 62
Oct. 12.	Deputy Minister of Finance		4 54
Oct. 24.	Telegrams		5 85
Nov. 17.	Deputy Minister of Finance		5 30
Dec. 8.	Telegrams		1 90
Feb. 4.	"		3 90

CR.

ESTATE OF WILLIAM BARNIE.

1920.			
July 16.	By Cash, E. J. Avison	$	543 88
Aug. 25.	" "		1,732 58
Oct. 16.	" Constable Taylor		105 90
Dec. 9.	" Constable Duncan		90 75

Dr.			Cr.		
	ESTATE OF JAMES BOYCE.			ESTATE OF A. BESSETT.	
1920.			1920.		
Dec. 21.	To Deputy Minister of Finance	$ 4 69	Mar. 16.	By Cash, Alex. Mills	$ 27 50
	ESTATE OF A. E. BURDETTE.			ESTATE OF JAMES BOYCE.	
1920.			1920.		
Dec. 20.	To Deputy Minister of Finance	$ 1 37	Dec. 10.	By Cash, E. J. Avison	$ 93 75
	Exchange	25		ESTATE OF A. E. BURDETTE.	
	ESTATE OF G. G. CHAPMAN.		1920.		
1920.			Dec. 8.	By Cash, Chief Constable O'Neill	$ 27 37
July 31.	To Deputy Minister of Finance	$ 12 14		ESTATE OF G. G. CHAPMAN.	
	M. L. Chapman	230 73	1920.		
	ESTATE OF AUSTEN CHRISTIANSEN.		June 30.	By Cash, E. J. Avison	$ 242 87
1920.					
Jan. 9.	To Official Administrator	$ 3 83			
	V. W. Lyle	75 00			
	ESTATE OF C. CHRISTIANSEN.			ESTATE OF C. CHRISTIANSEN.	
1920.			1920.		
Oct. 11.	To Deputy Minister of Finance	$ 0 45	Sept. 27.	By Cash, Chief Constable, Fort George	$ 9 00
Nov. 3.	Registrar, County Court	2 95	Nov. 22.	E. J. Avison	260 90
Dec. 21.	Deputy Minister of Finance	13 04			
	ESTATE OF A. COBER.				
1920.					
Feb. 10.	To Oliver Cober	$ 300 00			
May 8.	L. le Bourdais	7 65			
June 7.	E. C. Lunn	3 70			
Dec. 24.	Official Administrator	1 85			
	ESTATE OF A. DRINKROW.			ESTATE OF A. DRINKROW.	
1920.			1920.		
Jan. 5.	To Official Administrator	$ 20 00	Oct. 15.	By Cash, F. M. Sterry	$ 150 00
June 8.	Cariboo "Observer"	2 28	Jan. 9.	" Remittance to Treasury	400 00
Oct. 15.	E. J. Avison	50 00			
Nov. 12.	Deputy Minister of Finance	7 50			
	ESTATE OF A. DOW.				
1920.					
Feb. 28.	To E. J. Avison	$ 5 00			
April 1.	"	6 00			
Dec. 24.	Official Administrator	50			
	ESTATE OF FIE.			ESTATE OF FIE.	
1920.			1920.		
Oct. 11.	To Deputy Minister of Finance	$ 2 94	Aug. 24.	By Cash, E. J. Avison	$ 58 62
Dec. 16.	E. J. Avison	6 59			
	ESTATE OF ROBERT GARDNER.			ESTATE OF ROBERT GARDNER.	
1920.			1920.		
Jan. 5.	To Official Administrator	$ 4 22	Jan. 9.	By Remittance to Treasury	$ 84 50
May 27.	Provincial Treasury	44	May 31.	" "	8 75
July 31.	Deputy Minister of Finance	74	July 31.	" "	14 75
Nov. 25.	E. J. Avison	11 00			
	F. M. Becher	22 75			
	H. W. Haggen	60 00			
Dec. 23.	Official Administrator	1 59			
May 27.	Provincial Treasury	44			
	ESTATE OF C. A. GREGG.				
1920.					
April 7.	To Cariboo "Observer"	$ 12 60			
June 16.	E. J. Avison	34 16			
Sept. 20.	"	10 00			
	ESTATE OF W. GRELA.			ESTATE OF W. GRELA.	
1920.			1920.		
Nov. 12.	To Royal Bank of Canada	$ 80 00	Oct. 22.	By Cash, E. J. Avison	$ 100 91
Nov. 10.	Deputy Minister of Finance	5 05			
Nov. 18.	E. J. Avison	13 50			
1920.	ESTATE OF JOHN HEILMAN.		1920.	ESTATE OF JOHN HEILMAN.	
Jan. 31.	To Official Administrator	$ 2 00	Nov. 22.	By Cash, E. J. Avison	$ 10 00
Dec. 21.	Deputy Minister of Finance	5 00			
1920.	ESTATE OF HARRY HOLTMEYER.		1920.	ESTATE OF HARRY HOLTMEYER.	
Aug. 26.	To Registrar, County Court	$ 28 50	July 17.	By Cash, Constable Taylor	$ 143 05
Aug. 31.	Deputy Minister of Finance	7 15			
Dec. 24.	Official Administrator	3 35			
1920.	ESTATE OF GEORGE ISAACS.		1920.	ESTATE OF GEORGE ISAACS.	
Nov. 10.	To Deputy Minister of Finance	$ 12 50	Oct. 22.	By Cash, E. J. Avison	$ 250 00
Nov. 25.	E. J. Walker	25 00			
	F. Roddie	15 00			
	Cariboo Hospital	49 75			
	Mrs. McIntyre	37 50			
	M. Callahan	5 00			
	E. J. Avison	78 25			
	Cariboo "Observer"	27 00			

DR.

ESTATE OF H. S. JONES.

1920.			
Aug. 31.	To Registrar, County Court ...	$	9 40
Oct. 28.	E. J. Avison		52 25
May 8.	D. Cortess		275 00
May 28.	Provincial Treasury		27 40
Dec. 21.	Deputy Minister of Finance		5 40
Dec. 24.	Dr. Lyon		10 00
	D. F. M. Perkins		25 00
	Wm. Blair		28 00

ESTATE OF A. KJETSAA.

1920.			
Oct. 28.	To E. J. Avison	$	2 50
Nov. 10.	Deputy Minister of Finance		11 25

ESTATE OF M. MUNROE.

1920.			
Feb. 28.	To E. J. Avison	$	5 00
June 18.	Emery *et al.*		122 22
	Official Administrator		50

ESTATE OF JAMES MCDONALD.

1920.			
Jan. 9.	To Official Administrator	$	0 86

ESTATE OF JAMES MCKITRICK.

1920.			
Oct. 8.	To Deputy Minister of Finance	$	1 50

ESTATE OF JAS. MCLEESE.

1920.			
Oct. 1.	To Deputy Minister of Finance	$	1 24
	E. J. Avison		23 51

ESTATE OF WM. MCLENNAN.

1920.			
Mar. 2.	To E. J. Avison	$	23 51

ESTATE OF ANGUS MCPHAIL.

1920.			
April 1.	To W. Slade	$	37 05
May 28.	E. J. Avison		23 75
May 29.	Government Agent		5 00
June 7.	E. J. Avison		11 20
July 31.	Deputy Minister of Finance		5 00
Nov. 12.	„ „		3 95

ESTATE OF CHRIS. OLSEN.

1920.			
July 31.	To Deputy Minister of Finance	$	41 16

ESTATE OF JOSEPH OHLMANN.

1920.			
Dec. 21.	To Deputy Minister of Finance	$	5 00

ESTATE OF EDWIN PERKINS.

1920.			
Jan. 9.	To Official Administrator	$	0 75

ESTATE OF J. PERSON.

1920.			
Oct. 11.	To Deputy Minister of Finance	$	1 00

ESTATE OF JOSEPH LE POSTELLEC.

1920.			
Nov. 20.	E. J. Avison	$	10 00

ESTATE OF F. F. REGALADO.

1920.			
July 31.	To Deputy Minister of Finance	$	7 72

ESTATE OF CHARLES SCOTT.

1920.			
Oct. 2.	To E. J. Avison	$	62 55
Oct. 11.	Deputy Minister of Finance		83 00
Dec. 8.	King's Printer		6 50
Dec. 20.	Official Administrator		19 39

ESTATE OF JOHN SINN.

1920.			
Jan. 24.	To Le Bourdais	$	0 70
	Commission		360 00
Mar. 6.	L. le Bourdais		1 00
Mar. 1.	J. Murphy		45 95
Mar. 8.	H. H. Spencer		132 33
	County Court		50
June 30.	Official Administrator		75
July 24.	H. E. Sinn		173 24

CR.

ESTATE OF H. S. JONES.

1920.			
April 30.	By Cash, Canadian Bank of Commerce	$	548 10
Dec. 9.	„ E. J. Avison		108 07

ESTATE OF A. KJETSAA.

1920.			
Oct. 1.	By Cash, Bank of Montreal...	$	225 04

ESTATE OF JAMES MCKITRICK.

1920.			
Sept. 27.	By Cash, Chief Constable, Fort George	$	30 00

ESTATE OF JAS. MCLEESE.

1920.			
April 30.	By Cash, Mrs. Rose	$	24 75

ESTATE OF ANGUS MCPHAIL.

1920.			
June 1.	By Cash, Crook & Blanchard...	$	110 00
Oct. 25.	„ E. J. Avison		79 00

ESTATE OF CHRIS. OLSEN.

1920.			
July 5.	By Cash, Constable Taylor	$	825 25

ESTATE OF JOSEPH OHLMANN.

1920.			
Dec. 9.	By Cash, W. H. Dale	$	100 00

ESTATE OF J. PERSON.

1920.			
Sept. 27.	By Cash, F. J. Duncan	$	20 00

ESTATE OF F. F. REGALADO.

1920.			
July 31.	By Cash, Constable Taylor	$	154 48

ESTATE OF CHARLES SCOTT.

1920.			
Sept. 16.	By Cash, Constable Duncan....	$1,639 92	

DR.

ESTATE OF J. SPENCER (No. 2).

1920.			
Jan. 31.	To Official Administrator	$	0 69
Feb. 4.	A. W. Haddoch		135 00
Jan. 31.	Official Administrator, commission		11 59
May 31.	Center & Hanna		100 00
Aug. 23.	Deputy Minister of Finance		69
Sept. 7.	Registrar, County Court		39 58
Dec. 29.	Deputy Minister of Finance		24 79
Dec. 31.	Official Administrator		4 90

ESTATE OF WILLIAM TOWNSEND.

1920.			
May 30.	To E. J. Avison	$	32 95
Aug. 26.	Registrar, County Court		12 48
"	"		36 46
Oct. 11.	"		1 00
Dec. 7.	I. K. Kent		33 40
Dec. 8.	Government Agent		25 00
May 30.	Deputy Minister of Finance		5 65

ESTATE OF UGAN VIALI.

1920.			
July 31.	To Deputy Minister of Finance	$	7 46
Oct. 2.	E. J. Avison		49 75
Nov. 12.	Deputy Minister of Finance		20 45

ESTATE OF T. J. WILLIAMS.

1920.			
April 15.	To E. J. Avison	$	79 90
	C. Williams		4,357 43

CR.

ESTATE OF J. SPENCER (No. 2).

1920.			
Jan. 13.	By Cash, Official Administrator, Vancouver	$	231 82
May 3.	" Interest on loans		13 75
Nov. 22.	" Bank of Montreal		13 75
Dec. 6.	" Sale of War Bond		481 96

ESTATE OF WILLIAM TOWNSEND.

1920.			
Mar. 30.	By Cash, Tibbles	$	20 00
"	" Donnelly		48 00
April 30.	" "		45 00
June 21.	" E. J. Avison		45 78
July 19.	" Government Agent		60 00
"	" Wm. Saunders		4 50
July 26.	" Government Agent, sale of effects		619 00
Sept. 27.	" Government Agent		20 00

ESTATE OF UGAN VIALI.

1920.			
June 30.	By Cash, Constable Greenwood	$	10 50
"	" E. J. Avison		138 50
Oct. 11.	" Murdoch & Co.		408 90

EDGAR C. LUNN,
Official Administrator.

COLUMBIA ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN MORRISON.

1920.			
June 19.	To Taxes, 1920	$	60 16

ESTATE OF W. R. ROBERTS.

1920.			
Feb. 12.	To Taxes, 1919	$	1 21

ESTATE OF ALEX. VACHON.

1920.			
June 11.	To Administration fee	$	7 50
June 19.	Taxes, 1920		22 32

ESTATE OF WM. TROUTON.

1920.			
June 12.	To Law-stamp	$	1 00

ESTATE OF THOMAS STARBIRD.

1920.			
July 2.	To Express	$	0 45
	Administration fee		1 62

ESTATE OF CHARLES KITTILSON.

1920.			
June 11.	To Administration fee	$	13 44
June 19.	Taxes, 1920		14 40
July 3.	Administration fee		10 00
Dec. 29.	Administration fee		13 43

ESTATE OF WASYL STEFCHUK.

1920.			
June 11.	To Administration fee	$	1 38
Dec. 29.	Administration fee		1 37

ESTATE OF CARL OSCAR STEN (OR STONE).

1920.			
Jan. 30.	To Payment to father	$	1,346 44

ESTATE OF ALEX. VACHON.

1920.			
April 9.	By Cash	$	100 00
April 7.	"		50 00

ESTATE OF THOMAS STARBIRD.

1920.			
June 30.	By Cash	$	32 51

ESTATE OF CHARLES KITTILSON.

1920.			
Feb. 11.	By Cash	$	200 00
June 11.	"		55 00
"	"		13 75
July 2.	"		200 00
Dec. 1.	"		200 00
"	"		55 00
"	"		13 75

ESTATE OF WASYL STEFCHUK.

1920.			
June 11.	By Cash	$	27 50
Dec. 1.	"		27 50

DR.			CR.		
	ESTATE OF F. C. MARTIN.			ESTATE OF F. C. MARTIN.	
1920.			1920.		
Dec. 29.	To Administration fee	$ 1 78	Oct. 1.	By Cash	$ 35 50
	ESTATE OF FRANK FOUND.			ESTATE OF FRANK FOUND.	
1920.			1920.		
June 17.	To Administration fee	$ 5 00	June 17.	By Cash	$ 100 00
	Paid to widow	95 00			
	ESTATE OF ANTON FISHER.			ESTATE OF ANTON FISHER.	
1920.			1920.		
Dec. 29.	To Administration fee	$ 1 17	Dec. 20.	By Cash	$ 23 50

G. E. SANBORN,
Official Administrator.

COMOX ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.			CR.		
	ESTATE OF B. BOSKOVISK.			ESTATE OF B. BOSKOVISK.	
1920.			1920.		
April 2.	To Funeral expenses	$ 20 00	Nov. 11.	By Cash on deceased	$ 29 05
April 20.	Official Administrator	4 00	Jan. 7.	Time-check	40 20
Nov. 8.	Mike Boltovisk	45 25			
	ESTATE OF EMIL BRUNELL.				
1920.					
Feb. 20.	To "Comox Argus"	$ 4 35			
	ESTATE OF C. C. BUCHANAN.			ESTATE OF C. C. BUCHANAN.	
1920.			1920.		
Mar. 22.	To Funeral expenses	$ 86 00	Feb. 18.	By Cash on deceased	$ 64 00
May 26.	Death certificate	85	Mar. 3.	Wages due	60 35
Nov. 15.	Probate duty	2 31	Mar. 18.	Cash in bank	100 00
	Court costs	3 30	Mar. 19.	Interest	1 25
Dec. 4.	Solicitor's fees	10 00		Sale of personal effects	7 00
	Administrator	12 03			
	Postage and exchange	40			
	ESTATE OF WILLIAM BROWN.			ESTATE OF WILLIAM BROWN.	
1920.			1920.		
Dec. 4.	To Commission and postage	$ 3 80	Nov. 15.	By Wages	$ 70 19
	ESTATE OF EDWARD FREEMAN.			ESTATE OF EDWARD FREEMAN.	
1920.			1920.		
June 19.	To Letter of administration, etc.	$ 1 65	April 13.	By Rent of cabin	$ 29 00
July 12.	City taxes	47 20	June 19.	Sale of cabin	800 00
July 16.	Commission	42 00			
Nov. 26.	Swedish Consul	772 32			
	ESTATE OF T. FREEMAN.				
1920.					
June 10.	To Government taxes, 1920	$ 12 15			
Oct. 20.	P. P. Harrison	5 00			
	ESTATE OF THOMAS GREENALL.			ESTATE OF THOMAS GREENALL.	
1920.			1920.		
Dec. 4.	To Commission and exchange	$ 0 79	May 10.	By Cash on deceased	$ 2 00
			Nov. 10.	Time-check	10 90
	ESTATE OF J. W. GATEHOUSE.			ESTATE OF J. W. GATEHOUSE.	
1920.			1920.		
April 24.	To J. R. Biscoe	$ 14 00	April 24.	By Sale of Land	$ 280 00
	Letter of administration	1 00			
June 11.	Solicitor's fees	5 60			
	Commission	15 00			
	S. C. Gatehouse	259 65			
	ESTATE OF JOHN HARDY.			ESTATE OF JOHN HARDY.	
1920.			1920.		
July 10.	To Advertising sale of land	$ 4 50	June 29.	By Payment on land	$2,750 00
Mar. 24.	Government taxes	306 62			
Mar. 29.	" " "	57 25			
	Bank exchange	1 10			
April 7.	Letter of administration	1 10			
June 29.	Funeral expenses, balance	50 00			
July 10.	Commission	150 00			
	Solicitor's account	651 33			
	George Hardy	39 50			
Nov. 15.	Bank exchange	1 50			

DR.

ESTATE OF R. HOLM.

1920.			
June 10.	To Taxes on lots	$	0 90

ESTATE OF EMIL HILVORSEN.

1920.			
June 12.	To Emil Peterson	$	20 00

ESTATE OF GEORGE HILLARY.

1920.			
June 25.	To A. G. Forzè	$	7 20

ESTATE OF GEORGE E. HODGSON.

1920.			
Jan. 20.	To Funeral expenses	$	40 00
	Grave-digging		7 00
Feb. 2.	Solicitor's fees		10 00
April 3.	Commission		10 00
	S. Marshall		10 00
July 10.	Advertising		4 95
	J. Larson		26 10

ESTATE OF EDWARD HENEY.

1920.			
June 20.	To Funeral expenses	$	81 50
Dec. 4.	Sidney Marshall		15 00
	Official Administrator		7 00

ESTATE OF JOE DREBOIT.

1920.			
Feb. 2.	To Grave-digging	$	7 00
Feb. 10.	Funeral expenses		10 00
Feb. 2.	Commission and postage		2 50

ESTATE OF F. DIETZ.

1920.			
Feb. 2.	To Advertising	$	5 50
	Commission		12 00
May 18.	Solicitor's fees		20 00
	Mother of deceased		172 79

ESTATE OF D. MCEWEN.

1920.			
Dec. 24.	To Funeral expenses	$	110 50

ESTATE OF F. JOSS.

1920.			
Nov. 9.	To Clair Lomax	$	9 68

ESTATE OF JOHN F. JOHNSON.

1920.			
Nov. 1.	To Grave-digging	$	7 00
Feb. 18.	Court costs		4 30
Feb. 8.	Probate duty		26 73
Mar. 22.	Funeral expenses		15 00
Sept. 9.	Notary fees		2 30
Nov. 15.	Advertising, "Islander"		4 00
	Official Administrator		26 73
Jan. 14.	Registry of death, etc.		1 85
	Letter of administration		1 25
	Solicitor's fees		20 00

ESTATE OF WILLIAM MCLIVER.

1920.			
Nov. 25.	To Grave-digging	$	7 00
Feb. 18.	Court costs		4 30
	Probate duty		92 59
Mar. 22.	T. Sutton, funeral expenses		79 00
Sept. 8.	Notary fees		2 30
Nov. 15.	P. P. Harrison		20 00
	Advertising, "Islander"		4 00
	Official Administrator		92 70
	Bank exchange, etc.		3 65

CR.

ESTATE OF NORMAN HULBERT.

1920.			
Oct. 28.	By Cash on deceased	$	23 00
Dec. 13.	Wages		41 75

ESTATE OF GEORGE HILLARY.

1920.			
July 10.	By Refund on 1919 taxes	$	4 05

ESTATE OF THOMAS HOLMES.

1920.			
Dec. 13.	By Dividend, Dominion Trust Co.	$	2 37

ESTATE OF EDWARD HENEY.

1920.			
May 17.	By Cash on deceased	$	10 00
	Wages		67 15
Nov. 17.	Sale of boat		60 00

ESTATE OF JOE DREBOIT.

1920.			
Feb. 12.	By Remittance to Treasury	$	28 77

ESTATE OF F. DIETZ.

1920.			
Feb. 2.	By Remittance to Treasury	$	210 29

ESTATE OF D. MCEWEN.

1920.			
Nov. 3.	By Cash found in cabin	$	189 00
	Cheque		28 24
Dec. 29.	Wages due		130 21

ESTATE OF F. JOSS.

1920.			
Dec. 14.	By Dominion Trust Co.	$	6 62

ESTATE OF GEORGE ROSS.

1920.			
Mar. 22.	By Rebate to Official Administrator	$	7 40

ESTATE OF JOHN F. JOHNSON.

1920.			
Nov. 15.	By Wages due	$	157 47
	Cash in bank		329 43
	" "		47 82

ESTATE OF WILLIAM MCLIVER.

1920.			
Jan. 7.	By Wages due	$	327 40
Mar. 10.	Cash in Royal Bank		1,527 28

DR.

ESTATE OF JOHN MCKENZIE.

1920.			
Jan. 1.	To Boat-hire	$	25 00
Jan. 5.	Grave-digging		7 00
Feb. 18.	Court costs		5 30
	Probate duty		48 54
Mar. 22.	Funeral expenses		170 00
April 7.	Bank exchange, letter of administration		1 50
Sept. 8.	Notary fees		2 30
Nov. 15.	Advertising		4 00
	Solicitor's fees		20 00
Jan. 14.	Death certificate and exchange		1 00
Nov. 15.	Administration, postage, etc.		48 53

ESTATE OF ARMAND LEDRUE.

1920.			
Feb. 2.	To Advertising	$	4 00
	Solicitor's fees		20 00
	Commission		20 00

ESTATE OF J. J. TYNELE.

1920.			
Dec. 4.	To Commission, etc.	$	3 50

ESTATE OF H. MCLUSKEY.

1920.			
June 10.	To Taxes paid	$	7 29

ESTATE OF J. STAINER.

1920.			
Dec. 4.	To Official Administrator	$	2 40

ESTATE OF NEILS A. SANDBERG.

1920.			
Dec. 13.	To Swedish Consul	$	54 50

ESTATE OF E. STEWART.

1920.			
Feb. 22.	To Grave-digging	$	7 00

ESTATE OF WILLIAM A. STRICKLAND.

1920.			
Feb. 20.	To H. A. Strickland	$	350 00
Mar. 22.	O. H. Sacht, note		325 00
	„ store account		109 55

ESTATE OF STANKOFF SADAVOSKY.

1920.			
Nov. 15.	To Death certificate	$	0 85
	Court costs		4 30
	Probate, solicitor's fees		28 75
	Official Administrator		14 63
	Islander Printing Co.		5 20

INTESTATE ESTATE OF CLEOPHAS TETU.

1920.			
Jan. 10.	To Funeral expenses	$	177 00
Jan. 20.	Grave-digging		7 00
April 2.	Solicitor's fees		20 00
	Commission		31 00
Nov. 15.	"Comox Argus"		5 40

ESTATE OF THOMAS TOURVILLE.

1920.			
Feb. 16.	To Mary F. Root	$	45 17
Feb. 20.	Dr. Shaw, fees		40 00
	Dr. Caruthers, fees		25 00
	Campbell River Hospital		16 50
May 6.	Funeral expenses		200 00
April 29.	Probate duty		13 75
	Court costs		3 50
June 11.	Mary Root		933 49
	Official Administrator		69 00
	P. P. Harrison		25 00
	Advertising		4 00

ESTATE OF WILLIAM PHILLIPS.

1920.			
April 8.	To Court costs	$	6 05
Oct. 25.	Probate duty		91 41
Feb. 28.	Solicitor's fees		20 00
April 30.	Official Administrator		91 50
Nov. 26.	Advertising		4 00
July 24.	Inspector of Taxation		23 16
	E. Cudmore		88 85
Oct. 31.	Funeral expenses		177 00
	George Phillips		146 75

ESTATE OF ALBERT WILLIS.

1920.			
Nov. 26.	To Grave-digging	$	7 00
Mar. 5.	Funeral expenses		117 00
April 3.	Official Administrator		7 50

CR.

ESTATE OF JOHN MCKENZIE.

1920.			
Jan. 7.	By Wages	$	33 79
Nov. 1.	Victory bonds		493 75
Oct. 26.	Cash in bank		437 16
	Cash on deceased		1 00

ESTATE OF ARMAND LEDRUE.

1920.			
Feb. 2.	By Remittance to Treasury	$	358 29

ESTATE OF J. J. TYNELE.

1920.			
Aug. 13.	By Wages	$	64 49

ESTATE OF J. STAINER.

1920.			
Mar. 30.	By Cash on deceased	$	38 48

ESTATE OF STANKOFF SADAVOSKY.

1920.			
Nov. 23.	By Cash in bank	$	275 00
	Interest		2 92

INTESTATE ESTATE OF CLEOPHAS TETU.

1920.			
April 3.	By Remittance to Treasury	$	397 14

ESTATE OF THOMAS TOURVILLE.

1920.			
Feb. 16.	By Cash on deceased	$	45 17
	Time-checks		1,330 24

ESTATE OF WILLIAM PHILLIPS.

1920.			
Sept. 2.	By Wages due	$	177 62
	Cash in bank		1,645 14

1920. ESTATE OF ALBERT WILLIS.

Dec. 20.	By Wages due	$	136 20

Dr.			Cr.		
	ESTATE OF JOHN WHALSTROM.				
1920.					
Mar. 22.	To Swedish Consul	$ 182 59			
	ESTATE OF GEORGE WILLIAMS.			ESTATE OF GEORGE WILLIAMS.	
1920.			1920.		
Jan. 12.	To Letter of administration	$ 1 15	June 15.	By Sale of land	$ 200 00
July 16.	Commission and postage	11 00			
Dec. 26.	Solicitor's fees	10 00			
	ESTATE OF ALEX. WIBER.			ESTATE OF ALEX. WIBER.	
1920.			1920.		
Nov. 23.	To Death certicate, etc.	$ 1 50	Dec. 3.	By Cash in bank	$ 511 15
Dec. 27.	Court costs	4 30	Dec. 31.	Interest	4 55
	Funeral expenses	195 00			

WESLEY WILLARD,
Official Administrator.

CRANBROOK ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
	ESTATE OF CHRISTIAN BAUERLE.			ESTATE OF CHRISTIAN BAUERLE.	
1920.			1920.		
Feb. 7.	To Commission, O.A.	$ 0 85	Jan. 22.	By Deposit	$ 17 05
	ESTATE OF MRS. CARRIE BAKER.				
1920.					
Aug. 25.	To Amount paid to son	$ 57 16			
	ESTATE OF GIUSEPPE BISUTTI.			ESTATE OF GIUSEPPE BISUTTI.	
1920.			1920.		
Mar. 31.	To Funeral expenses	$ 231 00	Mar. 31.	By Deposit	$ 154 75
	Probate duty	13 83		Cash	200 55
April 7.	Commission, O.A.	17 75	April 17.	Deposit	634 99
May 7.	Publishing notice	4 68	April 30.	"	190 00
	Commission, O.A.	50 75	May 4.	Cheque	190 00
June 15.	Macdonald & Nisbet	39 00			
	Distribution of estate paid to Luidi Bisutti	1,013 28			
	ESTATE OF JOHN CONNOLLY.			ESTATE OF JOHN CONNOLLY.	
1920.			1920.		
Mar. 7.	To Express charges	$ 0 60	Feb. 17.	By Wages	$ 4 00
	Commission, O.A.	20			
	Funeral expenses	3 20			
	ESTATE OF WILLIAM DOULL.				
1920.					
Mar. 22.	To Gurd & Spreull, fees	$ 20 00			
	ESTATE OF F. C. EMMONS.			ESTATE OF F. C. EMMONS.	
1920.			1920.		
May 6.	To Commission, O.A.	$ 1 45	April 9.	By Wages	$ 29 20
May 7.	C. M. Green, loan	7 00			
Sept. 20.	Distribution of estate paid to W. F. Knight	20 75			
	ESTATE OF HENRY HEATH GRANT.			ESTATE OF HENRY HEATH GRANT.	
1920.			1920.		
Feb. 7.	To Funeral expenses	$ 7 60	Jan. 22.	By Cash	$ 8 00
	Commission, O.A.	40			
	ESTATE OF ROBERT MCKAY GUNN.			ESTATE OF ROBERT MCKAY GUNN.	
1920.			1920.		
Nov. 4.	To Funeral expenses	$ 45 00	Nov. 4.	By Cash	$ 45 00
	ESTATE OF STEVE HAWRYLKWL.				
1920.					
May 7.	To Order Stubs	$ 150 00			
	Railway ticket	52 00			
	Berths, board, etc.	25 00			
	Seven days' time at $3.50	24 50			
	ESTATE OF ROBERT HUGHES.			ESTATE OF ROBERT HUGHES.	
1920.			1920.		
June 15.	To Exchange on cheque	$ 0 15	June 15.	By Wages	$ 70 40
July 7.	Commission, O.A.	3 51			
	Funeral expenses	66 74			

DR.

ESTATE OF JESSE W. HOMAN.

1920.			
May 7.	To Commission, O.A.	$	4 95
	Balance of Estate paid to Gurd & Spreull		93 40

ESTATE OF HENRY HOGBERG.

1920.			
April 3.	To Distribution of estate paid to father	$	331 57

ESTATE OF THOMAS MYDDLETON JONES.

1920.			
June 7.	To Ed. Ferguson, taxes	$	6 66

ESTATE OF GIUSEPPE LENARDON.

1920.			
July 7.	To Commission, O.A.	$	2 95
July 8.	Funeral expenses		179 00
July 20.	Probate duty		5 21
Aug. 7.	Commission, O.A.		22 90
	Publishing notice		4 68

ESTATE OF RUSSELL LARKIN.

1920.			
Mar. 6.	To Funeral expenses	$	219 00
	Commission, O.A.		14 25
Nov. 10.	Paid to father		51 76

ESTATE OF JAMES LAWRENCE MORRISON.

1920.			
May 26.	To Exchange on cheque	$	0 25
June 7.	Commission, O.A.		3 36
June 25.	Probate duty		1 61
July 7.	A. C. Foote		7 70
	Commission, O.A.		4 75
	Paid to mother		145 24

ESTATE OF JOHN D. MASON.

1920.			
Jan. 28.	To Mrs. W. J. Bedden	$	68 70
	Miss E. M. Mason		68 70
	Miss M. M. Mason		68 70
	Mrs. M. J. Brennan		68 70
	Mrs. E. E. Dyer		68 73

ESTATE OF JOHAN VIKTOR NUMMELIN.

1920.			
April 9.	To Publishing notice	$	4 68
May 7.	Commission, O.A.		47 10
July 3	Macdonald & Nisbet		59 80

ESTATE OF CARL PEARSON.

1920.			
May 7.	To Commission, O.A.	$	0 40

ESTATE OF ANDREW SHULACK.

1920.			
July 7.	To Commission, O.A.	$	10 45
July 23.	Funeral expenses		234 00
Aug. 7.	Commission, O.A.		130 47
	Publishing notice		4 68

ESTATE OF GEORGE STEVENSON.

1920.			
Nov. 6.	To Commission, O.A.	$	65 60
	Funeral expenses		305 00
	Shipping body		186 60
	Telegrams		6 20
	St. Eugene Hospital		103 00
	Probate duty		67 05
	Little & Atchison		9 60
	Publishing notice		4 68
	Drs. Green & McKinnon, hospital attendance		90 00

ESTATE OF FRANCIS GEORGE SETTER.

1920.			
Dec. 7.	To Commission, O.A.	$	1 70
Mar. 6.	" "		55
May 7.	" "		55
July 7.	Refund of pensions		78 75

ESTATE OF JOHN T. SCANLON.

1920.			
Sept. 16.	To Provincial Taxes	$	81 50
Oct. 7.	Commission, O.A.		5 00

ESTATE OF HANAM (OR HARNAM) SINGH.

1920.			
Aug. 20.	To Amount of estate paid to mother	$	663 85

CR.

ESTATE OF JESSE W. HOMAN.

1920.			
April 9.	By Wages	$	98 35

ESTATE OF GIUSEPPE LENARDON.

1920.			
June 30.	By Wages	$	58 60
July 8.	Victory bonds		190 00
July 21.	Deposit		267 20
	Interest		66

ESTATE OF RUSSELL LARKIN.

1920.			
Mar. 6.	By Cash	$	20 00
	Deposit		58 55
	"		205 26
	Interest		1 20

ESTATE OF JAMES LAWRENCE MORRISON.

1920.			
May 26.	By Wages	$	67 55
June 30.	Deposit		95 36

ESTATE OF JOHAN VIKTOR NUMMELIN.

1920.			
April 9.	By Wages	$	23 22
April 17.	Deposit		918 18

ESTATE OF CARL PEARSON.

1920.			
April 9.	By Wages	$	7 55

ESTATE OF ANDREW SHULACK.

1920.			
June 30.	By Cash	$	112 10
	Wages		97 05
July 21.	Deposit		2,602 98
	Interest		6 40

ESTATE OF GEORGE STEVENSON.

1920.			
Nov. 1.	By Cash	$	41 40
	Government cheque		29 85
	Victory bonds		760 00
	Deposit		468 12
	Interest		2 70
Nov. 6.	Wages		10 50

ESTATE OF FRANCIS GEORGE SETTER.

1920.			
Dec. 10.	By Pension	$	11 25
June 5.	"		11 25
Feb. 5.	"		11 25
Mar. 6.	"		11 25
April 10.	"		11 25

ESTATE OF JOHN T. SCANLON.

1920.			
Sept. 16.	By Sale of lots	$	100 00

DR.

ESTATE OF PAUL TATRO (ALIAS TITRAULT).

1920.			
Nov. 6.	To Commission, O.A.	$	1 85
	Express charges		55
	Funeral expenses		34 10

ESTATE OF ALBERT TIMMEL.

1920.			
Mar. 6.	To Funeral expenses	$	149 80
	Commission, O.A.		7 90

ESTATE OF ADA WILSON.

1920.			
Nov. 23.	To F. M. MacPherson, funeral expenses	$	119 00

CR.

ESTATE OF PAUL TATRO (ALIAS TITRAULT).

1920.			
Oct. 16.	By Wages	$	36 50

ESTATE OF ALBERT TIMMEL.

1920.			
Mar. 6.	By Cheque	$	98 55
	Cash		9 70
	Cheque		49 45

ESTATE OF ADA WILSON.

1920.			
Nov. 20.	By Cash	$	113 40
	Refund		5 60

J. A. ARNOLD,
Official Administrator.

FERNIE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF WILLIAM EDWIN ASHLEY.

1920.			
June 19.	To Probate duty	$	19 68
	Legal expenses		33 00
Sept. 2.	Funeral expenses		172 50
Aug. 17.	Packing-case for effects		5 00
Sept. 2.	Freight on effects to heirs		16 21
July 10.	Commission		108 89

ESTATE OF GUST AXNER.

1920.			
Sept. 24.	To Probate duty	$	4 72
Oct. 14.	Legal expenses		26 65
Sept. 20.	Advertising		5 00
Sept. 24.	Funeral expenses		100 00
Nov. 24.	Commission		26 84

ESTATE OF FRANK BARTO.

1920.			
July 2.	To Commission	$	3 58

ESTATE OF PASQUALE BASILE.

1920.			
Jan. 26.	To Fee for certified copy of death certificate	$	0 75
Feb. 12.	Paid to heirs		96 77

ESTATE OF G. BOSETTI.

1920.			
Dec. 16.	To Commission	$	2 03

ESTATE OF GEORGE BRASSARD.

1920.			
Feb. 10.	To Paid to heir	$	52 25

ESTATE OF SEVERIN BROWN.

1920.			
July 10.	To Express on effects	$	0 40
July 21.	Paid to heirs		552 98

ESTATE OF ALEX. CASSETTI.

1920.			
Sept. 20.	To Commission	$	5 60
	Paid to heirs		1,777 22

ESTATE OF MIKE CHERNOVSKY.

1920.			
Sept. 2.	To Funeral expenses	$	40 00

ESTATE OF DILEP SINGH.

1920.			
Dec. 24.	To Funeral expenses	$	109 94
Dec. 16.	Commission		5 79

ESTATE OF OSCAR DE VOLDER.

1920.			
Dec. 20.	To Paid to heirs	$	296 85

CR.

ESTATE OF WILLIAM EDWIN ASHLEY.

1920.			
Mar. 10.	By D. O. Bricker, wages	$	69 30
June 9.	Canadian Bank of Commerce		2,108 58

ESTATE OF GUST. AXNER.

1920.			
Aug. 30.	By Cash on person	$	37 10
	Cash in trunk		263 52
Sept. 7.	Sale of effects		35 00
Sept. 27.	Canadian Pacific Railway Co., wages		74 70
Sept. 29.	Interest on Victory bond		6 88
Oct. 8.	Sale of Victory bond		48 79
Oct. 1.	Canadian Bank of Commerce		70 84

ESTATE OF FRANK BARTO.

1920.			
Feb. 19.	By Cash on person	$	71 65

ESTATE OF G. BOSETTI.

1920.			
Dec. 4.	By Rents collected	$	47 60

ESTATE OF ALEX. CASSETTI.

1920.			
July 14.	By Interest on Victory bond	$	13 75
Aug. 3.	Sale of Victory bond		98 28

ESTATE OF DILEP SINGH.

1920.			
Nov. 18.	By Ross-Saskatoon Lumber Co., Ltd., wages	$	115 73

DR.

ESTATE OF WILLIAM DUNN.

1920.			
Jan. 21.	To Law-stamps	$	1 20
Jan. 24.	Fire-insurance premium		5 50
Dec. 31.	Legal expenses		21 20
Jan. 10.	Paid to heirs		296 00
Dec. 16.	Commission		5 37

ESTATE OF EVAN EVANS.

1920.			
July 10.	To Commission	$	0 50

ESTATE OF MARIE FALIP.

1920.			
June 18.	To City of Fernie, 1920 municipal taxes	$	40 10
Dec. 24.	Repairs to property		14 00
Dec. 10.	Allowance to guardian		24 00

ESTATE OF JULES GABRIAN.

1920.			
Aug. 17.	To Provincial assessment tax	$	35 77
Dec. 13.	Fire-insurance premium		26 25
July 10.	Commission		1 20

ESTATE OF FRANK GAFFNEY.

1920.			
July 8.	To Funeral expenses	$	11 40
July 2.	Commission		60

ESTATE OF SARAH JANE GLOVER.

1920.			
Sept. 9.	To Paid to heirs	$	151 24

ESTATE OF MARINO GRIS.

1920.			
Aug. 27.	To Paid to heirs	$	2,598 00

ESTATE OF JOHN HADDEN.

1920.			
Dec. 24.	To Paid to creditors	$	17 50
	Funeral expenses		99 78
Oct. 14.	Commission		6 17

ESTATE OF JOHN HUNTER.

1920.			
Jan. 19.	To Municipal taxes	$	103 95
June 16.	Legal expenses		39 05
July 8.	Paid to creditors		257 30
Sept. 20.	Paid to heirs		75 00
July 10.	Commission		13 63

ESTATE OF P. V. JAMES.

1920.			
June 18.	To Municipal taxes	$	89 60
June 25.	Fire-insurance premium		81 00
Dec. 16.	Water rates		35 70
July 10.	Commission		8 75

ESTATE OF DAVID L. KELLY.

1920.			
Nov. 24.	To Timber-cruiser's fees	$	40 00
	Administrator's expenses		33 10
Oct. 14.	Commission		124 87

ESTATE OF NICK KASPERCZUK.

1920.			
Dec. 16.	To Commission	$	37 41

ESTATE OF ALBERT LIZAK.

1920.			
July 10.	To Express on effects	$	0 30

ESTATE OF MIKE MARMOL.

1920.			
June 16.	To Legal expenses	$	8 00
Dec. 23.	Alexander Macneil, under power of attorney from John Marmol, who was appointed administrator by order of Court dated April 8th, 1920	$	573 65

ESTATE OF JAMES MERCER.

1920.			
Aug. 21.	To Law-stamps and copy of letters of administration	$	3 10
	Paid to heirs		48 00

ESTATE OF DAVE MUIR.

1920.			
Dec. 24.	To Paid creditors	$	5 00

CR.

ESTATE OF WILLIAM DUNN.

1920.			
Oct. 29.	By Payment on sale of real estate	$	105 30

ESTATE OF EVAN EVANS.

1920.			
June 9.	By Interest on debentures	$	10 00

ESTATE OF MARIE FALIP.

1920.			
Nov. 23.	By Rents collected	$	20 00

ESTATE OF JULES GABRIAN.

1920.			
July 10.	By Rents collected	$	52 00

ESTATE OF FRANK GAFFNEY.

1920.			
Mar. 4.	By Cash on body	$	12 00

ESTATE OF JOHN HADDEN.

1920.			
Aug. 16.	By Cash on person	$	10 35
Aug. 24.	Elk Lumber Co., Ltd., wages		113 10

ESTATE OF JOHN HUNTER.

1920.			
Dec. 23.	By Payments on sale of real estate	$	534 65

ESTATE OF P. V. JAMES.

1920.			
Dec. 17.	By Rents collected	$	300 00

ESTATE OF DAVID L. KELLY.

1920.			
Dec. 7.	By Payments on sale of timber	$	4,015 69

ESTATE OF KASPERCZUK.

1920.			
Nov. 20.	By Home Bank of Canada	$	748 25

ESTATE OF JAMES MERCER.

1920.			
June 18.	By Interest on war bond	$	2 75
July 19.	Sale of war bond		48 35

ESTATE OF DAVE MUIR.

1920.			
Nov. 23.	By Cash on person	$	54 80

Dr.			Cr.		
Estate of Tom Muscovitch.			**Estate of Tom Muscovitch.**		
1920.			1920.		
Nov. 24.	To Express on effects	$ 0 35	July 12.	By East Kootenay Lumber Co., Ltd., wages	$ 19 35
	Commission	96			
Estate of Mario Oliva.			**Estate of Mario Oliva.**		
1920.			1920.		
July 3.	To Legal expenses	$ 21 13	June 18.	By Sale of real estate	$ 750 00
July 2.	Commission	37 50			
Aug. 24.	Paid to heirs	1,907 30			
Estate of Joseph O'Reilly.			**Estate of Joseph O'Reilly.**		
1920.			1920.		
Oct. 22	To Probate duty	$ 12 50	Aug. 16.	By Cash on person	$ 12 00
	Law-stamps, letters of administration	2 10	Aug. 24.	Elk Valley Lumber Co., Ltd., wages	203 25
Oct. 30.	Funeral expenses	110 00	Sept. 9.	Sale of effects	20 00
Oct. 11.	Commission	11 76			
			Estate of William Peredock.		
			1920.		
			Dec. 31.	By Imperial Bank of Canada	$ 413 80
Estate of Mark Poskitt.			**Estate of Mark Poskitt.**		
1920.			1920.		
Sept. 20.	To Advertising	$ 5 00	Jan. 20.	By Canadian Bank of Commerce	$1,164 78
Feb. 14.	Legal expenses	32 55	Feb. 5.	Canadian Pacific Railway Co., wages	62 50
May 22.	Funeral expenses	169 72	May 3.	Interest on Victory bonds	41 35
Nov. 13.	Commission	141 04	Oct. 6.	Sale of Victory bonds	1,465 60
Dec. 29.	Paid to heirs	2,368 48			
Estate of James Rivero.			**Estate of James Rivero.**		
1920.			1920.		
June 28.	To Taxes	$ 9 81	May 27.	By Interest on Victory bonds	$ 19 27
Aug. 26.	Commission	94 03	July 19.	Sale of Victory bonds	1,842 21
Aug. 27.	Paid to heirs	2,800 00			
Estate of Michael Roeser.			**Estate of Michael Roeser.**		
1920.			1920.		
Dec. 29.	To Legal expenses	$ 48 29	Oct. 27.	By Payment on purchase price of real estate	$ 272 90
Estate of Erich Schneider.			**Estate of Erich Schneider.**		
1920.			1920.		
Sept. 2.	To Paid to creditors	$ 34 50	Feb. 19.	By Cash on person	$ 48 03
	Funeral expenses	40 00	April 10.	Great Northern Railway Co., wages	53 81
July 2.	Commission	5 09	Sept. 9.	Sale of effects	15 00
Estate of Paul Shingara.			**Estate of Paul Shingara.**		
1920.			1920.		
Dec. 31.	To Legal expenses	$ 24 45	Aug. 5.	By Balance on real estate sold	$ 94 00
July 2.	Commission	7 00			
Estate of P. Suhovoirsky.					
1920.					
Jan. 10.	To Paid to heir	$ 33 36			
Estate of James Morris Wainwright.			**Estate of James Morris Wainwright.**		
1920.			1920.		
July 2.	To Commission	$ 0 94	June 14.	By Cash on person	$ 13 40
			Mar. 10.	Waldorf Hotel, Fernie, wages	5 50

G. G. MOFFATT,
Official Administrator.

GRAND FORKS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
Estate of Alex. Batrynowski.					
1920.					
Aug. 14.	To Town Treasurer, Kerrobert, Sask., taxes on lots	$ 2 91			
			Estate of John Juzwow.		
			1920.		
			Dec. 31.	By Cash from J. C. Taylor for diamond ring	$ 128 25

DR.

ESTATE OF RONALD GEORGE BILLINGSLEY.

1920.			
Sept. 23.	To J. F. Murray, P.O. Inspector, refund of salary overpayment	$	5 40

ESTATE OF CHARLES PELLETIER.

1920.			
Sept. 1.	To Jas. H. Ryley, solicitor's costs	$	60 13
	C. F. McDougall, F. C. Weer account		45 00
	Donald McCallum, Administrator's commission		46 11

CR.

ESTATE OF RONALD GEORGE BILLINGSLEY.

1920.			
Jan. 27.	By Cash from sale of interest in auto to R. D. McCabe	$	250 00

ESTATE OF JOHN MAY.

1920.			
Oct. 30.	By Great Northern Rly. Co., proceeds of bond payments	$	22 05
	Royal Bank of Canada, premium U.S. cheque		1 90
	Royal Bank of Canada, cash for bond sold		53 03

ESTATE OF CHARLES PELLETIER.

1920.			
Aug. 20.	By Royal Bank of Canada, cash on deposit	$	120 04
Aug. 31.	Canadian Bank of Commerce, cash on deposit		802 18
Oct. 30.	Canadian Pacific Rly. Co., refund of cash		14 00

DONALD McCALLUM,
Official Administrator.

GREENWOOD ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF T. A. McDONALD.

1920.			
May 31.	To Taxes	$	16 80
Nov. 30.	I. H. Hallett		48 62

ESTATE OF ROBERT GILLIAN.

1920.			
Jan. 31.	To Rock Creek Trading Co.	$	396 92
Oct. 31.	I. H. Hallett		53 15
Nov. 30.	F. E. Cooper		150 00
	Dr. C. M. Kingston		97 10

CR.

CHARLES KING,
Official Administrator.

KAMLOOPS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GUS ANDERSON.

1920.			
Mar. 11.	To Express paid on effects	$	0 50

ESTATE OF LIONEL BOURASSA.

1920.			
Mar. 5.	To Ovide Bourassa, father	$	17 19

CR.

ESTATE OF GUS ANDERSON.

1920.			
Mar. 11.	By Cash on person	$	6 05
May 18.	Cheque from Province of British Columbia, refund of poll-tax overpaid by deceased		5 00

DR.

ESTATE OF ROBERT BUNT.

1920.			
Mar. 20.	To Commission	$	1 50
April 20.	"		1 50
April 21.	"		1 50
April 20.	Plastering account		15 00
May 3.	Exchange		05
June 16.	Commission		5 25
June 17.	Exchange		25
	City of Kamloops		328 07
July 22.	Commission		1 75
Aug. 3.	Exchange		05
Aug. 24.	Commission		1 75
Oct. 21.	Giddens's account		9 50
	Blackbourn's account		54 60
	Commission, Rowlands		3 50
Nov. 1.	Exchange		05
Nov. 13.	Blackbourn, on account painting		67 50
Nov. 23.	Commission, Rowlands		1 75
Dec. 28.	" "		1 75

ESTATE OF FRANK BERRY.

1920.			
Jan. 13.	To Hospital account	$	5 00
Jan. 29.	Exchange		25
Feb. 3.	"		35
Feb. 5.	District Registrar		33 77
	J. R. Archibald		25 85
	J. L. Gordon		100 00
	F. T. Cornwall		13 52
Mar. 4.	Ashcroft Hospital, *re* account		6 75
	R. Fraser		18 00
	Dr. S. E. Beech		169 00
	F. T. Cornwall		25 70
April 8.	"		2 00
April 10.	Ashcroft Print Co.		10 00
	Burris, Archibald & Burris		60 00
Mar. 2.	Exchange		65

ESTATE OF DAISY MARY BRIANT.

1920.			
Jan. 22.	To F. T. Cornwall	$	9 74
	Exchange		25
	" A. F. Raisen		139 68

ESTATE OF WALTER H. CLEMENTS.

1920.			
Feb. 18.	To Exchange on cheques	$	45
Mar. 2.	"		05
Mar. 5.	J. R. Archibald		21 10
	M. A. Clements		31 26
Dec. 17.	Exchange		15

ESTATE OF ELI CASTONGUAY.

1920.			
Sept. 10.	To Hospital account deducted	$	49 00
Oct. 1.	Exchange		25
Oct. 4.	F. T. Cornwall		13 00
	District Registrar		6 40
	J. R. Archibald		16 30
	R. A. Dwyer		75 00
	A. Madden		5 00
	Burris, Archibald & Burris		35 00

ESTATE OF WILFRED B. DAVENPORT.

1920.			
June 1.	To Exchange	$	0 20
	District Registrar		62
	F. T. Cornwall		6 72
	J. R. Archibald		23 85
	"Telegram"		9 00
Sept. 13.	Fee for two certificates of death		1 25

CR.

ESTATE OF ROBERT BUNT.

1920.			
Mar. 20.	By Cheque from Powell	$	30 00
April 20.	" "		30 00
April 21.	" "		30 00
June 16.	" "		105 00
July 22.	" "		35 00
Aug. 24.	" How		35 00
Oct. 21.	" "		70 00
Nov. 23.	" "		35 00
Dec. 28.	" "		35 00

ESTATE OF FRANK BERRY.

1920.			
Jan. 13.	By Cash on person per hospital	$	72 45
Jan. 29.	Cheque on Bank of Montreal, Ashcroft, balance to credit of deceased		198 04
Feb. 18.	Cheque from Imperial Bank, proceeds of sale of $500 bonds and accrued interest		502 10
Mar. 31.	Cash from L. McCarthy in payment of old clothing, saddle, gun, etc.		40 00

ESTATE OF DAISY MARY BRIANT.

1920.			
Jan. 21.	By Cash from Imperial Bank, purchase price of bond and accrued interest	$	101 30

ESTATE OF ELSEOR BESSETTE.

1920.			
Aug. 19.	By Cash on person	$	8 82
Sept. 3.	Cheque from Whitmore in payment of personal effects		2 00

ESTATE OF PETER CHERNIAK.

1920.			
Mar. 5.	By Cheque from C.N.R., wages due	$	25 60

ESTATE OF WALTER H. CLEMENTS.

1920.			
Feb. 18.	By Cheque from liquidator, Canadian Home Investment Co.	$	15 73
	Ditto		14 61
	"		22 52
Dec. 17.	"		12 36

ESTATE OF ELI CASTONGUAY.

1920.			
Sept. 10.	By Cash on person per Royal Inland Hospital	$	251 35

ESTATE OF WILFRED B. DAVENPORT.

1920.			
April 16.	By Cash on person per Sanatorium	$	0 80
	Two £1 notes, English currency		8 20
May 29.	Cheque on Royal Bank, balance to credit of deceased		103 53

DR.

ESTATE OF JOHN TREVOR DAVIES.

1920.			
Jan. 4.	To Exchange	$	0 30

ESTATE OF GEORGE THOMAS EUNSON.

1920.			
Mar. 31.	To Andrew Eunson	$	4 24
	John Eunson		4 24
	William Eunson		4 25
	Isabella Eunson		4 25
	Charlotte Petrie		4 25
	Mary E. Wilson		4 25
	Royal Inland Hospital		10 00

ESTATE OF JOSEPHINE EGRESITZ.

1920.			
June 28.	To Auctioneer's fee	$	14 22
July 2.	Exchange		15
	F. T. Cornwall		11 00
	R. A. Dwyer		50 00
	R. I. Hospital		2 00
	J. McCannell		4 00
	Drs. Irving and Murphy		32 50
	Kamloops Press, Ltd.		6 50

ESTATE OF WILLIAM M. EITE.

1920.			
Aug. 11.	To S. E. Eite	$	182 82
Dec. 10.	Exchange		10

ESTATE OF GEORGE W. FLINT.

1920.			
April 6.	To Exchange	$	0 50
	F. T. Cornwall		20 42
	District Registrar		3 47
	J. R. Archibald		27 65
	J. L. Gordon		196 00
	Mrs. A. M. Ades		15 20
April 16.	"Telegram"		9 00

ESTATE OF D. FRASCATORE.

1920.			
May 20.	To Exchange	$	0 25
June 17.	Fee retained by A. O. Cochrane		5 00
July 2.	Fee		10
	F. T. Cornwall		5 40

ESTATE OF ALEXANDER FOSTER.

1920.			
May 21.	To City of Kamloops, taxes	$	10 92
July 7.	Corporation of Burnaby		3 19

ESTATE OF JOHN FRANK.

1920.			
Sept. 2.	To Exchange	$	0 15
	J. R. Archibald		30 50
Oct. 9.	Kamloops Press, Ltd.		4 20

ESTATE OF P. GRECO.

1920.			
May 19.	To Exchange	$	0 50
	Fee retained by A. O. Cochrane		5 00
June 17.	Exchange		25
July 2.	"		30
	J. R. Archibald		17 70
	A. E. Sage		38 50
	F. T. Cornwall		12 55
July 22.	Exchange		40
July 24.	Fee on office copy, letters of administration		10
Aug. 3.	Fee		15

ESTATE OF JOHN HAMMER.

1920.			
Oct. 8.	To Phoning Goudreau	$	0 35

CR.

ESTATE OF JOHN TREVOR DAVIES.

1920.			
Dec. 7.	By Cheque from H. Bostock	$	115 70
Dec. 10.	" A. B. Taite		60 00
	" Lackenby		16 00
	" Eaton's		7 19
	Cash on person		12 95
Dec. 21.	Cheque on Bank of Hamilton, balance to credit of deceased		25 16

ESTATE OF JOSEPHINE EGRESITZ.

1920.			
June 28.	By Cheque, proceeds of sale of jewellery	$	144 20
July 14.	Cheque from Ure, proceeds of sale of jewellery		12 00

ESTATE OF WILLIAM M. EITE.

1920.			
Dec. 10.	By Cheque from Salmon Arm Farmers' Exchange	$	1 65

ESTATE OF GEORGE W. FLINT.

1920.			
Mar. 24.	By Cheque on Bank of Montreal	$	408 40
April 6.	" from C.P.R., wages due		34 85

ESTATE OF D. FRASCATORE.

1920.			
May 20.	By Cheque from Stewart & Co., wages due deceased	$	27 10
June 17.	Cash on person		73 30

ESTATE OF JOHN FRANK.

1920.			
Aug. 11.	By Cash from Adams, purchase price of mare	$	30 00
	Cash from Reed, purchase price of mare		60 00

ESTATE OF P. GRECO.

1920.			
May 19.	By Cheques from Stewart & Co.	$	122 25
June 17.	Cheque from Stewart & Co.		90 65
	Cash on person		15 90
July 27.	Cheque on Canadian Bank of Commerce		112 73

ESTATE OF JOHN HAMMER.

1920.			
Dec. 10.	By Cash from Goudreau	$	75 00

DR.

ESTATE OF M. E. HARRIS.

1920.			
Nov. 22.	To Exchange	$ 0	25
Dec. 2.	,,		40
Dec. 4.	H. V. Harris (voucher returned, cancelled)		
Dec. 6.	District Registrar	1	01
	Mrs. Spencer	146	60
	Official Administrator	15	50
Dec. 13.	J. R. Archibald	26	85

ESTATE OF ARMUND O. HAGEN.

1920.			
Jan. 13.	To Hospital account	$ 60	00
Jan. 29.	Exchange	1	00
	,,	1	25
Jan. 3.	,,	2	65
Jan. 4.	R. H. Dwyer	100	00
Jan. 5.	District Registrar	102	87
	J. R. Archibald	28	25
	F. T. Cornwall	107	87
April 10.	Ashcroft Print Co.	10	00
April 16.	Burris, Archibald & Burris	65	00
Dec. 29.	Royal Norwegian Consul	1,678	66

ESTATE OF JAMES HILL.

1920.			
April 6.	To Exchange	$ 0	60
April 12.	Fee paid for office copy of letters of administration		10
May 3.	Exchange		25
May 4.	District Registrar	8	19
	F. T. Cornwall	11	00
	J. R. Archibald	15	00
	Dr. Pettman	40	50

ESTATE OF ANTONIA INTRANI.

1920.			
May 19.	To Exchange	$ 0	50
June 17.	,,		25
	Fee retained by A. O. Cochrane	5	00
July 2.	Exchange		35
	J. R. Archibald	17	70
	A. E. Sage	38	50
	F. T. Cornwall	15	64

ESTATE OF MAGNUS JOHNSON.

1920.			
Mar. 24.	To Exchange	$ 0	15
April 6.	,,		25
April 8.	,,		15
April 13.	,,	1	00
April 9.	R. H. Dwyer	100	00
April 12.	District Registrar	32	34
April 19.	J. R. Archibald	23	25
May 3.	Exchange		80
May 4.	F. T. Cornwall	38	82
May 21.	"Telegram"	9	00

ESTATE OF A. JOHNSON.

1920.			
April 10.	To Fee paid for letters of administration, office copy	$ 0	10
May 3.	Exchange		25
May 4.	Official Administrator	10	75
Oct. 7.	Swedish Consul	216	47

ESTATE OF ALEXANDER JACKSON LEWIS.

1920.			
Sept. 2.	To Exchange	$ 0	05
Sept. 9.	J. R. Archibald	27	10
Oct. 1.	Exchange		65
Oct. 2.	F. T. Cornwall	26	95
	District Registrar	24	21
	J. L. Gordon	75	00
	J. McCannell	20	00
Oct. 9.	Kamloops Press	9	00
Oct. 23.	Royal Inland Hospital	22	00
Nov. 8.	Commission, D. B. Johnstone	6	00
Dec. 2.	Exchange		20
Dec. 6.	Drs. Irving & Murphy	37	50
Dec. 30.	C. Lee	5	00

ESTATE OF JOHN LOYER.

1920.			
Sept. 20.	To Drs. Burris, Archibald & Burris	$ 60	00

CR.

ESTATE OF M. E. HARRIS.

1920.			
Nov. 22.	By Cheque on Imperial Bank of Canada, Chase	$ 92	70
	Ditto, Kamloops	212	08

ESTATE OF ARMUND O. HAGEN.

1920.			
Jan. 13.	By Cash on person per hospital	$ 90	00
	Northern Construction Co., wage-cheques	271	70
	Cheque on Union Bank, Vancouver	799	45
	Cheque on Royal Bank, Winnipeg	996	40

ESTATE OF JAMES HILL.

1920.			
Mar. 2.	By Cash on person	$ 3	92
April 6.	Cheques from Stewart & Co.	200	40

ESTATE OF A. J. IANSON.

1920.			
Dec. 27.	By Cheque from C.N.R.	$ 90	25

ESTATE OF ANTONIA INTRANI.

1920.			
May 19.	By Cheques, wages due to deceased	$ 108	80
June 17.	Cheque from Stewart & Co., wages due	93	80
	Cash on person	76	84

ESTATE OF MAGNUS JOHNSON.

1920.			
Mar. 24.	By Cash on person	$ 178	00
	Cheque from Stewart & Co.	17	50
April 8.	,, ,,	29	50
April 13.	,, on Union Bank, Ducks	551	45

ESTATE OF A. JOHNSON.

1920.			
April 10.	By Cheque from Northern Construction Co.	$ 170	10

ESTATE OF ALEXANDER JACKSON LEWIS.

1920.			
Aug. 2.	By Cash on person	$ 16	28
Aug. 21.	Cheque from C. Lee	25	00
Sept. 3.	,, H. Willis	65	00
	,, Whitmore	16	00
Sept. 9.	,, Bank of Hamilton	293	08
Sept. 20.	,, Urchitz	75	00
Sept. 24.	,, ,,	40	00
Nov. 8.	,, D. B. Johnstone	120	00
Dec. 30.	,, C. Lee	25	00

DR.

ESTATE OF TONE LEE.

1920.			
Oct. 1.	To Exchange	$ 0	40
Feb. 20.	Johnstone & Rowlands	28	50
May 21.	City of Kamloops	22	66
Aug. 24.	Kohing Yih	250	00
Oct. 1.	F. T. Cornwall	15	00

ESTATE OF ANTON J. MELKIN (OTHERWISE MILKEN).

1920.			
Mar. 2.	To Cheque to W. Rushkowski	$ 100	00
	" R. E. Alexander	231	80
	Exchange		50
	"	2	50
April 6.	"	1	45
April 10.	F. T. Cornwall	74	18
May 3.	Cheque to cover succession duty	273	70
	Cheque to Canada Permanent Corporation	88	00
Dec. 13.	Ditto	81	25

ESTATE OF JAMES MAZZETTO.

1920.			
Jan. 2.	To F. T. Cornwall	$ 52	11
	Royal Italian Consul	334	00

ESTATE OF DONALD MUNRO.

1920.			
Jan. 26.	To Express paid on suit-case	$ 0	50
Feb. 12	Griffin & Co.	5	50
June 19.	F. T. Cornwall		50
	W. Canfield	1	42

ESTATE OF CHARLES MEYERS.

1920.			
Feb. 6.	To Burris, Archibald & Burris	$ 12	50
Feb. 13.	Kamloops Press, Ltd.	9	00
Mar. 2.	Exchange		20
Mar. 5.	F. T. Cornwall	8	10
Nov. 2.	L. T. Blair	36	20

ESTATE OF A. V. MATTSON.

1920.			
Feb. 13.	To Kamloops Press, Ltd.	$ 9	00
July 17.	Exchange		25
	Cheque to cover draft of A. K. Cates's account	75	42
Sept. 3.	A. M. Lundin	421	05
Sept. 7.	Commission	11	65
	Exchange		25
Sept. 8.	Fee paid on certified copy of letters of administration	1	00
Oct. 1.	Exchange		15
Oct. 5.	F. T. Cornwall	55	00
	Swedish Consul	1,016	53
Oct. 6.	Fee on office copy of letters of administration		10
Oct. 7.	Express paid on jewellery	1	40
Oct. 22.	Moore & Lynd	4	16

ESTATE OF J. MILOS.

1920.			
June 30.	To Express paid on gun	$ 0	95
	Tax-collector	1	10

ESTATE OF T. NAIRN.

1920.			
Sept. 30.	To City of Kamloops, taxes	$ 50	35
	G. N. Barclay	98	70
Oct. 1.	Exchange	1	70
Oct. 6.	F. T. Cornwall	110	00
Oct. 11.	Water Comptroller	44	55

ESTATE OF JOHN NICHOLAS (OR JIMMY CABBAGE).

1920.			
Jan. 5.	To A. J. McMullen	$ 4	55
July 29.	"	4	55

ESTATE OF JOHN O'BRIEN.

1920.			
Feb. 6.	To Filing office copy of letters of administration	$ 0	50
Mar. 2.	Exchange		10

ESTATE OF MIKE POTOSKY.

1920.			
Dec. 13.	To J. R. Archibald	$ 63	00
	F. M. Clark	104	10

CR.

ESTATE OF TONE LEE.

1920.			
Sept. 1.	By Cash from Wong Yim	$ 50	00
Sept. 15.	" "	250	00

ESTATE OF ANTON J. MELKIN (OTHERWISE MILKEN).

1920.			
Mar. 2.	By Cheque from W. Rushkowski	$ 471	95
	" on Union Bank	1,004	30
	" "	7	50
May 3.	Cheque on Union Bank, Gull Lake, paid by agent	273	70
	Ditto	88	00

ESTATE OF DONALD MUNRO.

1920.			
Jan. 26.	By Cash on person	$ 7	92

ESTATE OF CHARLES MEYERS.

1920.			
Feb. 5.	By Cash from F. Gaven	$ 142	00

ESTATE OF A. V. MATTSON.

1920.			
July 17.	By Cheque from Guthrie & Co.	$ 70	88
Sept. 7.	" "	116	65

ESTATE OF J. MILOS.

1920.			
June 30.	By Cash from W. Stewart	$ 5	00

ESTATE OF T. NAIRN.

1920.			
Sept. 30.	By Cheque from A. Goudreau	$1,500	00

ESTATE OF JOHN O'BRIEN.

1920.			
Feb. 6.	By Cash from A. Latremouille	$ 75	00

DR.

ESTATE OF JOE PREFICH.

1920.			
April 15.	To Exchange	$	0 15
May 4.	F. T. Cornwall		1 00
	Dr. Pettman		15 00
Oct. 2.	„		2 00

ESTATE OF AUGUST PFETTSCHER.

1920.			
Jan. 14.	To F. T. Cornwall	$	10 00
	R. A. Pfettscher		98 61
	E. F. Pfettscher		98 62

ESTATE OF WILLIAM ROCHELEAU.

1920.			
July 2.	To F. T. Cornwall	$	0 85
	J. L. Gordon		10 50

ESTATE OF STEFANO RIZZO.

1920.			
Mar. 9.	To F. T. Cornwall	$	2 00
Mar. 16.	Italian Consul		208 58

ESTATE OF GEORGE P. RAVEN.

1920.			
Mar. 9.	To Exchange	$	0 50
Mar. 15.	Land Settlement Board		376 62
April 6.	Exchange		20
April 7.	F. T. Cornwall		25 96
	J. R. Archibald		28 80
	Kamloops Agencies		27 00
	"Telegram"		16 28
	Standard		5 32
July 2.	Exchange		65
	F. T. Cornwall		53 34
	J. L. Gordon		125 00
	Morphy & Co.		10 00
	G. N. Burt		54 65
July 17.	Telephone call, Barriere		40
Aug. 3.	Exchange		70
	City of Kamloops		331 50
Aug. 7.	Drewry & Cornwall		25 00
Aug. 24.	Land Settlement Board		234 00
Sept. 2.	Exchange		20
Oct. 1.	„		1 25
Oct. 2.	F. T. Cornwall		475 00
Oct. 9.	Kamloops Press		5 32
Oct. 11.	Letters of administration		1 00

ESTATE OF FRANK SEGUIN.

1920.			
April 30.	To F. T. Cornwall	$	2 75
	Elda Seguin		221 22

ESTATE OF FRANK SMITH.

1920.			
Sept. 2.	To Exchange	$	0 15
Oct. 4.	F. T. Cornwall		6 25
	District Registrar		5 87
	J. R. Archibald		16 30
Nov. 11.	Kamloops "Telegram"		9 00

ESTATE OF RICHARD SUTTON.

1920.			
Oct. 1.	To Exchange	$	0 15
Oct. 5.	City of Salmon Arm		1 04

ESTATE OF EDWARD O. SKAHL.

1920.			
Dec. 31.	To Exchange	$	0 05

ESTATE OF NICK STOKE OR STOKAL.

1920.			
Feb. 20.	To F. T. Cornwall	$	1 00
	R. B. Ellis		6 75

ESTATE OF JOSEPH SCHEUCHER.

1920.			
Mar. 4.	To Borland & McIntyre	$	64 37
Aug. 24.	„ „		27 00

ESTATE OF GEORGE THOW.

1920.			
July 2.	To Exchange	$	0 15
Feb. 4.	L. A. Sawyer		28 00
Oct. 16.	Water Comptroller		3 20
Jan. 2.	Exchange		15
	Sawyer		25

CR.

ESTATE OF JOE PREFICH.

1920.			
Mar. 31.	By Cash on person	$	1 15
April 15.	Cheque from Stewart & Co.		15 00
Sept. 3.	„ Whitmore		2 00

ESTATE OF WILLIAM ROCHELEAU.

1920.			
June 4.	By Cash on person	$	11 35

ESTATE OF STEFANO RIZZO.

1920.			
Mar. 9.	By Cheque from Batty Bros.	$	4 00

ESTATE OF GEORGE P. RAVEN.

1920.			
Jan. 31.	By Cash on person	$	2 33
Mar. 2.	Cheque from Fraser		375 00
Mar. 4.	U.S. pension cheque		120 00
	Exchange on U.S. cheque		14 00
Mar. 8.	Cheque from Davidson		8 00
June 7.	„ Allan		500 00
July 14.	„ „		500 00
	„ „		54 45
Aug. 17.	„ „		137 63
Sept. 1.	„ „		1,000 00

ESTATE OF FRANK SMITH.

1920.			
Aug. 21.	By Cheque from Forestry Department, wages due	$	97 44
Sept. 13.	Cheque from A. Miller		20 00

ESTATE OF RICHARD SUTTON.

1920.			
Sept. 22.	By Cheque from Canadian Bank of Commerce	$	1 19

ESTATE OF EDWARD O. SKAHL.

1920.			
Dec. 21.	By Cheque from Cornwall & Archibald	$	26 18

ESTATE OF NICK STOKE OR STOKAL.

1920.			
Jan. 27.	By Cash on person	$	7 75

ESTATE OF JOSEPH SCHEUCHER.

1920.			
Sept. 3.	By Cheque from Whitmore	$	3 00

ESTATE OF GEORGE THOW.

1920.			
June 9.	By Cash from J. W. Austin	$	100 00

DR.

ESTATE OF DAVID VUKSA.

1920.			
May 3.	To Exchange	$	0 20
May 4.	District Registrar		3 53
	F. T. Cornwall		8 00
	J. R. Archibald		17 80
	J. L. Gordon		50 00
	R. Cviganvich		30 50

ESTATE OF ARTHUR J. WARD.

1920.			
May 3.	To Exchange	$	0 05
May 22.	„		25

CR.

ESTATE OF DAVID VUKSA.

1920.			
April 7.	By Cheque on Bank of Montreal	$	150 75

ESTATE OF ARTHUR J. WARD.

1920.			
April 24.	By Cheque from Cochrane & Ladner	$	55 50
May 22.	Cheque on Bank of Hamilton		8 75

WM. CROSSLEY,
Official Administrator.

KASLO AND SLOCAN ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF FRANCESCO ALBRECHI.

1920.			
Jan. 30.	To Czechoslovak Consul-General	$1,062	07

ESTATE OF JOHN BARBARO.

1920.			
June 23.	To R. Bolton	$	5 28
July 14.	R. Newman		2 00

ESTATE OF JOHN T. BEAUCHESNE.

1920.			
May 31.	To Deputy Minister of Finance, commission	$	2 88
June 7.	J. McRae		23 75

ESTATE OF GUISEPPI (JOSEPH) CERVA.

1920.			
June 17.	To J. Cechelero (for heirs)	$1,082	91

ESTATE OF PETER CURRIE.

1920.			
Nov. 30.	To Deputy Minister of Finance	$	1 98

ESTATE OF RUSSELL HONE.

1920.			
Nov. 30.	To Deputy Minister of Finance	$	22 48
Dec. 16.	W. Hunter, rent		40 00

ESTATE OF JAMES HUNT.

1920.			
Jan. 23.	To Provincial Collector, Revelstoke	$	7 43

ESTATE OF OSCAR JOHNSON.

1920.			
June 30.	To Deputy Minister of Finance	$	17 50
July 15.	Registrar, County Court		1 00
Aug. 11.	J. Blomberg		4 38

ESTATE OF JACOB KELSEN.

1920.			
Feb. 17.	To John R. Kelsen	$	233 23

ESTATE OF JOHN KRUPA.

1920.			
May 11.	To Czechoslovak Consul-General	$	104 85

ESTATE OF NELS LARSEN.

1920.			
Jan. 30.	To Swedish Consul	$	44 63

CR.

ESTATE OF JOHN T. BEAUCHESNE.

1920.			
May 7.	By G. M. Gunn	$	7 60
May 20.	K. Zimmerman		50 00

ESTATE OF PETER CURRIE.

1920.			
Nov. 8.	By Deputy Attorney-General	$	39 79

ESTATE OF JOSEPH EDWARDS.

1920.			
Feb. 26.	By Sale of valise	$	1 00
Mar. 15.	„ trunk		5 00

ESTATE OF RUSSELL HONE.

1920.			
Nov. 8.	By G. M. Gunn, sale of effects	$	428 90
Nov. 25.	„ „		18 00
Nov. 30.	„ „		2 75

ESTATE OF ALEX. JOHANSON.

1920.			
Feb. 27.	By J. Campbell	$	7 50

ESTATE OF OSCAR JOHNSON.

1920.			
June 10.	By C. Swan	$	350 00

DR.

ESTATE OF LEANDRE LAURIN.

1920.			
Jan. 19.	To Donaghy & Donaghy	$	7 00
Feb. 18.	Philomane Laurin		2,192 75
	Maglione Laurin		34 79
	Olivier Laurin		34 79
	Joseph Laurin		34 79
	Adeline Davoust		34 81
	Delphis Joanette		11 59
	Albini Joanette		11 60
	Malvina Joanette		11 60
	Hector Laurin		4 34
	Leonidas Laurin		4 35
	Amanda Croteau		4 35
	Bertha Trotfier		4 35
	Fabiola Laurin		4 35
	Albert Laurin		4 35
	Anthessie Laurin		4 35
	Lydia Laurin		4 35

ESTATE OF LEOPOLD LISSA.

1920.			
June 17.	To J. Cechelero (for heirs)	$1,363	14

ESTATE OF GUISEPPE LOSCO.

1920.			
June 17.	To J. Cechelero (for heirs)	$	850 38

ESTATE OF DONALD MCINTYRE.

1920.			
Nov. 4.	To Deputy Minister of Finance, commission	$	1 75
Nov. 30.	Ditto		3 97

ESTATE OF EDWARD W. ROBINSON.

1920.			
May 11.	To W. A. Shepherd	$	19 04
May 15.	Collector, South Vancouver		30 16
May 28.	" North Vancouver		4 41
June 21.	C. Lomax		5 55
July 20.	Rec. County Court, Kaslo		2 00
Nov. 23.	Hamilton & Wragge		56 96
	Richard Robinson (father)		1,419 87

ESTATE OF AUGUSTA GENETTE ROSEN.

1920.			
June 30.	To Deputy Minister of Finance, commission	$	2 26

ESTATE OF IGNACE SANGOLA.

1920.			
April 26.	To Joseph Sangola	$1,336	07

ESTATE OF WILLIAM P. SIMPSON.

1920.			
June 30.	To Deputy Minister of Finance, commission	$	11 06
Aug. 21.	Provincial Collector, Kaslo		18 01

ESTATE OF ULISSE STEDILE.

1920.			
April 6.	To Italian Consul	$	432 26

ESTATE OF JOHN STREET.

1920.			
Nov. 4.	To Deputy Minister of Finance, commission	$	4 24

ESTATE OF NICHOLAS VOCOVICH.

1920.			
Dec. 31.	To Deputy Minister of Finance, commission	$	16 52
	G. Trickett, funeral expenses		175 30

ESTATE OF STEPHEN WOOD.

1920.			
Mar. 3.	To O. Lermo	$	4 00
Mar. 12.	"		2 00
May 25.	Government Agent, Revelstoke, refund of funeral expenses		25 00
Nov. 30.	Deputy Minister of Finance, commission		1 00

CR.

ESTATE OF DONALD MCINTYRE.

1920.			
Oct. 21.	By G. M. Gunn	$	35 00
Nov. 30.	G. M. Gunn, sale of effects		79 50

ESTATE OF AUGUSTA GENETTE ROSEN.

1920.			
June 8.	By C.P. Rly. Co., sale of right-of-way	$	45 35

ESTATE OF WILLIAM P. SIMPSON.

1920.			
June 22.	By M. L. Hollister	$	221 25
Dec. 11.	Bank of Montreal		33 55

ESTATE OF JOHN STREET.

1920.			
Oct. 21.	By G. M. Gunn	$	84 99

ESTATE OF NICHOLAS VOCOVICH.

1920.			
Dec. 16.	By A. Arden, cash on body	$	330 55

ESTATE OF STEPHEN WOOD.

1920.			
Nov. 13.	By Ben Fielding	$	20 00

RONALD HEWAT,
Official Administrator.

COUNTY OF NANAIMO.

(EXCEPTING THEREFROM THE ELECTORAL DISTRICT OF COMOX.)

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ROBERT PINKERTON.

1920.		
Jan. 20.	To J. S. Yates, legal expenses	$ 25 00
	E. M. Yarwood	25 00
	Mrs. M. M. Thompson	350 00
	Robt. Pinkerton, half of $1,791.58	895 79
	Eldon Harris Pinkerton	895 79
Feb. 9.	Commission	1 25
Feb. 26.	M. M. Thompson	23 75
	"	23 75
May 15.	"	50 00
April 17.	"	25 00
July 22.	"	47 50
Aug. 12.	Commission	2 50

ESTATE OF WILLIAM THOMPSON.

1920.		
Jan. 24.	To Assessor and Collector, 1920 taxes on part of Lot 32	$ 9 00

ESTATE OF ROBERT RAEBURN.

1920.		
Oct. 25.	To E. H. Tucker, 1920 taxes, Lots 8 and 9, Edson	$ 2 10

ESTATE OF ROBERT WALKINSHAW.

1920.		
Jan. 13.	To Official Administrator, commission	$ 25
June 1.	Registrar, certified copy of letters of administration	1 00
Aug. 3.	Chas. Peterson	36 00
	Geo. C. Ross	22 50
	Ladysmith General Hospital	55 90
	New Ladysmith Lumber Co.	5 95
Aug. 12.	Simon Leeson & Co.	37 30
	John A. Ryan	36 90
	Ladysmith Wab. Co.	2 25
	Ladysmith Baker Co.	4 95
	A. C. Frost, M.D.	50 00

ESTATE OF CHARLES G. BUGSTADT (OR BERGSTEDT).

1920.		
July 14.	To A. Leighton	$ 5 00
	Emanuel Agron, as per power of attorney	347 99

ESTATE OF CHARLES J. HEWSON.

1920.		
Dec. 10.	To Department of Finance	$ 2 11

ESTATE OF HENRY BIGGS.

1920.		
July 9.	To Brackman & Ker	$ 25 46

ESTATE OF BERNARD O. ERICKSON.

1920.		
Dec. 24.	To Royal Norwegian Consul	$ 52 89
Dec. 28.	Registrar, County Court, Nanaimo	82

ESTATE OF GEORGE COMPTON.

1920.		
Jan. 23.	To Real-property tax and school for year 1920	$ 17 73

ESTATE OF LOUIS JOHNSON.

1920.		
Aug. 3.	To Jo. Erlandson, translating Norwegian correspondence	$ 1 50
Dec. 10.	A. Leighton, perusing papers, correspondence, and advice	3 00

ESTATE OF EMIL RANTENNIN.

1920.		
Jan. 24.	To R. McCallam, school taxes, 1918 and 1919	$ 31 20
Dec. 3.	A. Leighton, legal letters	1 50

CR.

ESTATE OF ROBERT PINKERTON.

1920.		
Jan. 16.	By Remitted to Treasury	$ 25 00
Mar. 15.	" "	50 00
April 17.	" "	25 00
July 8.	" "	50 00

ESTATE OF ROBERT WALKINSHAW.

1920.		
Jan. 13.	By J. Stewart, rents	$ 5 05

ESTATE OF CHARLES J. HEWSON.

1920.		
Dec. 10.	By Sale of furniture	$ 42 50

DR.

ESTATE OF NORMAN STANLEY CUTHBERTSON.

1920.		
Nov. 11.	To Stokes & Stokes	$ 84 40

ESTATE OF CHARLES WEIRICH.

1920.		
Feb. 12.	To A. Leighton	$ 51 00
April 15.	Deputy Minister of Finance	6 10
July 5.	„ „	50
Oct. 1.	„ „	1 00

ESTATE OF JOHN DOHERTY.

1920.		
Nov. 20.	To Registrar, probate duty	$ 1 27

ESTATE OF JOSEPH FILEPICH.

1920.		
June 1.	To Registrar, law-stamps and Treasury forms	$ 2 50

ESTATE OF NICK KURETICH.

1920.		
Jan. 26.	To A. Mahle, board bill and cash advanced	$ 27 80
	C. J. Allen	3 50
July 1.	Registrar, probate duty	97
	„ law-stamps, etc.	2 60

ESTATE OF ALBERT FRANCEOUR.

1920.		
Nov. 20.	To Deputy Minister of Finance	$ 28 97
	Registrar, probate duty	3 19
	D. J. Jenkins	145 00
	Dr. J. E. Montgomery	40 00
	Ladysmith Transfer Co.	5 00
	A. Leighton	15 70

ESTATE OF JOHN BUUMALA.

1920.		
Nov. 19.	To District Registrar, law-stamps	$ 2 30
	Deputy Minister of Finance	5 00
	„ „	50
Dec. 10.	D. J. Jenkins, funeral expenses	102 50

CR.

ESTATE OF CHARLES WEIRICH.

1920.		
Mar. 13.	By J. Gold, interest	$ 10 00
Mar. 23.	S. Melzer, principal and interest	112 00
June 23.	S. Melzer, interest	10 00
Sept. 20.	„ interest	10 00
Sept. 28.	J. Gold, interest	10 00

ESTATE OF ALBERT FRANCEOUR.

1920.		
Nov. 20.	By Canadian Bank of Commerce	$ 579 53

ESTATE OF JOHN BUUMALA.

1920.		
Nov. 19.	By Victoria Lumber & Manufacturing Co.	$ 100 30
	Ditto	10 00

S. McB. SMITH.
Official Administrator.

NELSON AND TRAIL ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JAMES STEWART.

1920.		
Mar. 11.	To O'Shea & Farris	$ 45 60

ESTATE OF ROBERT DIXON.

1920.		
April 30.	To Commission	$ 35 93
April 23.	Creston Merchandise Co.	6 85

ESTATE OF GEO. HENRY FISCHER.

1920.		
May 20.	To Mining Recorder	$ 5 00

ESTATE OF WM. MAHER.

1920.		
Jan. 20.	To Donaghy & Donaghy	$ 44 80
Aug. 1.	A. C. Mesker	318 14

ESTATE OF WM. BURGH.

1920.		
Jan. 15.	To Commission	$ 2 50
Jan. 19.	W. T. McNeil	4 90
Jan. 30.	O'Shea & Farris	8 25

CR.

ESTATE OF ROBERT DIXON.

1920.		
Mar. 1.	By Mortgage and interest on property	$ 718 67

ESTATE OF WM. BURGH.

1920.		
Jan. 14.	By Postmaster	$ 50 00

DR.

ESTATE OF CLARK & CAHILL.

1920.			
Jan. 19.	To Joe Dearin	$	139 00
	M. L. Hollister		50 00
	Mrs. Thos. Hawes		25 00
Mar. 11.	O'Shea & Farris		23 10

ESTATE OF ANDREW G. ERICKSON.

1920.			
Jan. 15.	To Commission	$	3 75
Jan. 19.	Assessor and Collector		5 95
April 30.	Provincial Collector, Kaslo		12 75

ESTATE OF VIKTOR NELSON.

1920.			
April. 6.	To Royal Consul of Sweden	$	75 90

ESTATE OF JOHN MIDDLETON.

1920.			
Jan. 15.	To Commission	$	6 40
Jan. 19.	F. E. Cooper, funeral		187 00

ESTATE OF RONALD STONIER.

1920.			
Jan. 30.	To R. Andrew & Co.	$	8 50
May 20.	Mining Recorder		5 00
Aug. 6.	Frank and Jessie Stonier		1,565 47

ESTATE OF THOS. MELROSE.

1920.			
Feb. 20.	To J. E. Annable	$	29 00
July 20.	S. McLean		36 00
	S. Thornberg		36 00
Aug. 6.	Commission		25 00
Sept. 20.	„		25 00

ESTATE OF SAMUEL UNDERHILL.

1920.			
Mar. 11.	To O'Shea & Farris	$	6 50
June 28.	Registrar Supreme Court		100 87
Dec. 17.	H. A. Masters		7 00

ESTATE OF MICHELE LIPPA.

1920.			
Jan. 19.	To J. H. Doyle, copy of letters	$	1 00
	J. H. Schofield		17 35

ESTATE OF ERNESTO PERIN.

1920.			
Jan. 30.	To Noble Binns, funeral	$	150 00
Aug. 31.	Royal Consul-General for Sweden		202 17

ESTATE OF J. ZETSUNK.

1920.			
Mar. 11.	To O'Shea & Farris	$	13 50
Oct. 19.	Standard Furniture Co., burial		35 20

ESTATE OF J. GEBHART.

1920.			
Jan. 19.	To Mrs. C. Clark, funeral	$	51 25
	Assessor and Collector, taxes		3 16
Mar. 11.	O'Shea & Farris		12 84

ESTATE OF WALTER TAYLOR.

1920.			
Mar. 11.	To O'Shea & Farris	$	54 40
Oct. 19.	O'Shea & Farris, taxes		33 52

ESTATE OF OWEN SAUNDERS.

1920.			
Jan. 30.	To D. J. Robertson, funeral	$	100 00
June 28.	Registrar, Supreme Court		2 72

ESTATE OF BEN JOHNSON.

1920.			
Jan. 30.	To Commission	$	10 25
	O'Shea & Farris		2 50
	Standard Furniture Co., funeral		143 50
June 28.	Registrar, Supreme Court		5 02
Oct. 19.	Consul-General		84 13

ESTATE OF IVAN NACINK.

1920.			
Jan. 30.	To N. Binns	$	9 00
	A. McDonald		49 02

ESTATE OF A. G. FLINT.

1920.			
Jan. 20.	To N. Binns, funeral	$	122 50
Jan. 30.	A. McDonald		63 26
Aug. 6.	Beatrice E. Flint		832 48

CR.

ESTATE OF ANDREW G. ERICKSON.

1920.			
Jan. 14.	By Sale of lots	$	75 00

ESTATE OF JOHN MIDDLETON.

1920.			
Jan. 14.	By C. P. R., wages	$	128 00

ESTATE OF THOS. MELROSE.

1920.			
Aug. 6.	By One-third interest of mining claim	$	500 00
Sept. 6.	Ditto		500 00

ESTATE OF BEN JOHNSON.

1920.			
Jan. 30.	By Bank Account		205 00

DR.

ESTATE OF FRED JURAGOWSKI.

1920.			
Jan. 15.	To Commission	$ 23	29
	N. Binns, funeral	150	00

ESTATE OF GUISEPPE SCLIPPA.

1920.			
Jan. 15.	To Commission	$ 10	96
Jan. 30.	D. McDonald	41	85
Oct. 19.	Royal Consul-General of Italy	166	50

ESTATE OF JOSEPH PERE.

1920.			
Jan. 15.	To Commission	$ 16	35

ESTATE OF CARMINO PARMA.

1920.			
Jan. 15.	To Commission	$ 15	83
Jan. 20.	N. Binns, funeral	151	45
Jan. 30.	D. McDonald	45	23

ESTATE OF JOHN JAMES.

1920.			
Jan. 15.	To Commission	$ 2	00
Jan. 30.	"	46	82
	N. Binns funeral	125	00
	J. H. Doyle	6	80
Mar. 11.	O'Shea & Farris	61	45
Aug. 6.	Jas. A. James	367	18
	John James	367	18
Oct. 31.	Commission	8	24
Aug. 10.	H. R. Adie	6	00
	J. H. Doyle	6	50
Dec. 9.	"Daily News"	2	80
Dec. 21.	Commission	3	75

ESTATE OF PAUL OUELLETTE.

1920.			
April 30.	To Exchange	$ 0	30
	Commission	2	42
June 12.	"	15	63
June 28.	Registrar, Supreme Court	12	00
	G. T. Store N. D., funeral,	99	00
Oct. 31.	J. H. Doyle	2	00
Dec. 15.	S. J. Towgood	12	00
	O'Shea & Farris	59	77
	T. B. Roberts, grave	15	00

ESTATE OF J. M. QUARRY.

1920.			
June 12.	To Commission	$ 24	37
Dec. 10.	"		75
	W. H. Cawley	4	00
	O'Shea & Farris	49	27
	Drs. Thom, Coghlin & Nay	30	00
Dec. 13.	Commission	9	18
Dec. 17.	Mrs. H. F. McCaslin	6	15
	Mrs. Henry B. Quarry	562	41

ESTATE OF DAGMAR AUGUSTA FRAHNER.

1920.			
May 22.	To Standard Furniture Co., funeral	$ 115	50
June 12.	Commission	32	76
Dec. 21.	J. Radcliffe, rent	17	50
	O'Shea & Farris, disbursements	5	10

ESTATE OF BEN CROWTHER.

1920.			
July 2.	To Commission	$ 41	14
Aug. 4.	O'Shea & Farris	85	95

ESTATE OF JOHN MICHAEL MULLEN.

1920.			
Aug. 31.	To Commission	$ 110	87
Oct. 19.	Registrar, Supreme Court	90	30
Nov. 6.	O'Shea & Farris	120	65
Dec. 13.	G. F. Ahlin, inventory	3	00

ESTATE OF JOHN BOYLE.

1920.			
Sept. 30.	To Commission	$ 38	26
	T. M. Bowman, probate duty	51	39
	O'Shea & Farris	31	50
	C. G. Beeston	644	10

ESTATE OF W. L. DUNSTAN.

1920.			
Sept. 30.	To Commission	$ 23	52
	O'Shea & Farris	42	15
Oct. 19.	Standard Furniture	176	50
Oct. 31.	J. H. Doyle	9	60
Dec. 8.	Kootenay Lake General Hospital	11	65
Dec. 10.	T. M. Bowman, probate duty	25	54

CR.

ESTATE OF JOSEPH PERE.

1920.			
Jan. 8.	By Cash per Chief Gammon	$ 327	00

ESTATE OF JOHN JAMES.

1920.			
Jan. 14.	By Sale of hay	$ 40	00
	Proceeds of bond	486	25
	Wages, etc.	80	75
	Bank account	369	44
Oct. 14.	Payment on sale of land	149	85
Oct. 27.	Sale of effects	15	00
Nov. 5.	Sale of land	35	00
Dec. 4.	"	40	00

ESTATE OF PAUL OUELLETTE.

1920.			
April 28.	By Rambler-Cariboo Mines, wages	$ 25	37
	O.A., Kaslo	23	00
May 26.	Bank account	312	75
Oct. 14.	Sale of stock	40	00

ESTATE OF J. M. QUARRY.

1920.			
May 11.	By Proceeds of bond	$ 487	50
Dec. 10.	" chattels	15	00
Dec. 13.	Bank Account	183	63

ESTATE OF DAGMAR AUGUSTA FRAHNER.

1920.			
May 13.	By Proceeds of sale	$ 173	75
May 14.	Bank account	501	52

1920. ESTATE OF BEN CROWTHER.

June 12.	By Sun Life Insurance Co.	$ 822	98

ESTATE OF JOHN MICHAEL MULLEN.

1920.			
Aug. 17.	By Bank account	$2,217	75

1920. ESTATE OF JOHN BOYLE.

Sept. 30.	By P.O. account	$ 765	25

1920. ESTATE OF W. L. DUNSTAN.

Sept. 3.	By Bank account	$ 470	56
Oct. 26.	Sale of Bonds	192	00

DR.

ESTATE OF JERRY O'DONNEL.

1920.			
Dec. 10.	To W. Clark, funeral	$	146 40
	Collector, redemption		69 65
Dec. 21.	Commission		17 00

ESTATE OF PAOLA SODA.

1920.			
June 30.	To Italian Consular Agent	$	814 04

ESTATE OF V. MONIACO.

1920.			
July 2.	To Italian Consular Agent	$	101 29

ESTATE OF JOSEPH FISCO.

1920.			
April 30.	To J. H. Doyle, commission	$	2 25
May 20.	D. J. Robertson		76 73

CR.

ESTATE OF JERRY O'DONNEL.

1920.			
Dec. 9.	By Sale of land	$	300 00
Dec. 21.	Bank account		40 00

ESTATE OF JOSEPH FISCO.

1920.			
Feb. 11.	By C.P.R., wages	$	45 00

JAMES A. DOYLE,
Official Administrator.

COUNTY COURT, DISTRICT OF NEW WESTMINSTER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF R. BARRY.

1920.			
July 13.	To A. W. Petapiece, legal expenses	$	32 58
	W. R. Jaynes, launch for police		20 00
	Provincial Police, auto for body		8 00
	H. C. Major, commission		12 03
Aug. 3.	W. E. Fales, funeral expense		25 00
Aug. 9.	Columbian Co., advertising		4 80

ESTATE OF BHAGWAN SINGH.

1920.			
Dec. 1.	To H. C. Major, commission	$	5 10
	N. H. Lidster, legal expense		48 71
	Columbian Co., advertising		3 96

ESTATE OF JOHN BRINKS.

1920.			
Aug. 2.	To Registrar, succession duty	$	807 10
	" probate duty		430 89
	Registrar, copies of letters of administration		8 50
	Liquidator, Dominion Trust—		
	For will		5 00
	Two copies of same		1 80
	Renunciation		5 00
Aug. 12.	Bank interest on loan to pay above amounts		2 15
	Bank interest collection charges		15 90
Sept. 1.	F. Layton, legal		121 00
Sept. 15.	Chilliwack "Progress," advertising		18 80
Dec. 1.	H. C. Major, commission		639 97
	" postage, etc.		1 00

ESTATE OF JOHN CARVER.

1920.			
Aug. 10.	To Taxes 1920, Lots 5 and 9	$	24 07
	Registration of deed		4 60
Sept. 1.	C. G. Major, cash advanced		270 00

ESTATE OF MARTHA CAMERON.

1920.			
Mar. 1.	To Corbould & Grant	$	28 80

ESTATE OF HENRY COLVIN.

1920.			
July 18.	To Exchange	$	0 20
Aug. 3.	Delta Municipality, funeral		37 00
	H. C. Major, commission		6 50

CR.

ESTATE OF R. BARRY.

1920.			
June 21.	By Cash on person	$	164 42
	Wages, Ed. Elder		76 35

ESTATE OF BHAGWAN SINGH.

1920.			
Nov. 24.	By Wages	$	102 00

ESTATE OF JOHN BRINKS.

1920.			
Aug. 12.	By Royal Bank, Chilliwack	$12,726	67
Sept. 22.	Auditor, Province of Quebec		72 75

ESTATE OF JOHN CARVER.

1920.			
Aug. 10.	By G. F. Welch, sale of lots, Burnaby	$	300 00

ESTATE OF HENRY COLVIN.

1920.			
July 18.	By Sale of launch	$	85 00
	" cooking-utensils		6 00
	" rifle		5 00
	" fishing-gear		15 00
	" net		7 00
	" saw		2 00
	" shack		10 00

DR.

ESTATE OF DENNIS CURTIN.

1920.			
Jan. 1.	To H. C. Major, commission...	$	3 20

ESTATE OF EMELIO CLEMENTIA.

1920.			
Mar. 17.	To S. Bowell, funeral	$	45 00
	R.C. Hospital		6 00
	J. G. McKay, M.D.		15 00
June 1.	H. C. Major, commission...		2 11

ESTATE OF JOSEPH C. CAMPBELL.

1920.			
Mar. 1.	To J. D. Kennedy, legal	$	47 05
	"Columbian"		4 20
	H. C. Major, commission...		25 72
	E. Pope, digging grave		4 00
	T. L. Parker, taking body to grave		12 00
	Harron Bros., casket		55 00
May 18.	J. A. McInnes, judgment on account		150 00
July 28.	Ditto		216 85

ESTATE OF ALEX. CAMPBELL.

1920.			
Jan. 27.	To copies of letters of administration	$	2 00
	J. D. Kennedy, legal		18 75
Feb. 10.	"Columbian," advertising..		3 12
Mar. 1.	H. C. Major, commission...		7 03
	S. Bowell, funeral		100 00
	Drs. Walker & Green		6 45
	R.C. Hospital		2 37
	City of New Westminster..		88

ESTATE OF WILLIAM CLYDE.

1920.			
Sept. 1.	To L.R.O., filing letters	$	0 50
Oct. 3.	Bourne McDonald, legal ...		53 80
	"Columbian," advertising..		16 80
	H. C. Major, commission...		10 00

ESTATE OF MARIE ANGE DESPRES.

1920.			
May 28.	To Copy of letters and filing same	$	1 50
	Taxes to date		5 00
	H. C. Major, commission...		5 00
	„ postage		15

ESTATE OF JAMES DEACON.

1920.			
June 15.	To Registrar, duty	$	8 35
July 5.	Telegrams and commission on sale		16 40
	Copy of letters		2 00
July 6.	J. S. Clute, legal		23 45
	S. Bowell, funeral		85 00
July 9.	A. W. Petapiece, legal		2 50
Aug. 19.	Assessor, Quesnel, taxes S.W. ¼ Sec. 6, Tp. 78 (1916–19)		76 00
	Interest on same		3 40
	1920 taxes		19 00
Oct. 30.	Exchange on draft		1 77
Nov. 16.	J. G. Duncan		50 00
Dec. 1.	H. C. Major, commission...		44 83
	„ telegrams		5 00

ESTATE OF JOHN FRASER.

1920.			
June 1.	To H. C. Major, commission...	$	9 00
Dec. 1.	„ „ ...		12 00

ESTATE OF J. H. FLACK.

1920.			
June 1.	To H. C. Major, commission...	$	2 17
June 8.	Murchie, funeral		14 00

ESTATE OF ROBERT FLECK.

1920.			
Dec. 1.	To H. C. Major, commission...	$	6 81
	Probate duty		56 47
	Succession duty		279 54

ESTATE OF JOHN ROSS FOORD.

1920.			
June 29.	To Land and school tax, 1920..	$	56 23
Sept. 21.	Ditto, too late for rebate..		6 24

CR.

ESTATE OF EMELIO CLEMENTIA.

1920.			
Feb. 13.	By Royal Bank	$	12 39
April 17.	C. Cassino, sale of bedspread		30 00

ESTATE OF JOSEPH C. CAMPBELL.

1920.			
Jan. 14.	By Port Hammond, police	$	103 50
Feb. 6.	Canadian Bank of Commerce		411 32

ESTATE OF ALEX. CAMPBELL.

1920.			
Jan. 19.	By R.C. Hospital	$	34 20
Feb. 3.	C.N. Rly., wages		96 90
Feb. 23.	„ refund from bond		9 50

ESTATE OF WILLIAM CLYDE.

1920.			
Sept. 1.	By Bourne McDonald, sale of Lot 23	$	200 00

ESTATE OF MARIE ANGE DESPRES.

1920.			
May 28.	By Sale of lot	$	100 00

ESTATE OF JAMES DEACON.

1920.			
June 15.	By Canadian Bank of Commerce	$	240 86
July 5.	Pouce Coupe, rent of land..		50 00
	Sale of effects		48 75
	Royal Bank, rent		7 00
Oct. 30.	F. C. Hasler, *re* Pouce Coupe land-sale		550 00
Dec. 11.	Refund interest paid by A. J. Elliott		8 15

ESTATE OF JOHN FRASER.

1920.			
July 5.	By Cope, three payments	$	180 00
Oct. 6.	„ to July 2nd, 1920 ...		60 00
Dec. 29.	„		60 00

ESTATE OF J. H. FLACK.

1920.			
April 29.	By Robt. Dollar Co., wages ...	$	43 46

ESTATE OF ROBERT FLECK.

1920.			
Nov. 16.	By Cash on person	$	14 45
	Wages		73 90
	Refund, Western Star Lodge I.O.O.F.		48 00
Dec. 7.	Bank of Nova Scotia		314 40
	Sale of bond		93 55
	Wages, C.P.R.		157 32

DR.

ESTATE OF HARRY GOODFELLOW.

1920.			
June 1.	To H. C. Major, commission...	$ 97	35
Dec. 1.	„ „ ...	41	50
	„ sundries		50

ESTATE OF EDWIN GARDNER.

1920.			
June 1.	To H. C. Major, commission...	$ 26	65
	„ auto-hire	6	00
Oct. 23.	Jno. R. Gardner	77	89
	Jas. F. Gardner	77	90
	Harry Gardner	77	90
	Albert Gardner	77	90
	Arthur Gardner	77	90

ESTATE OF WILLIAM GRAHAM.

1920.			
Mar. 15.	To Cambridge, probate	$ 7	51
	Murchie, funeral	253	00
	R. C. Best, board, cemetery plot, auto	81	00
	A. S. Johnston, legal	51	16
	A. W. Petapiece	2	00
	"Columbian"	5	40
	H. C. Major, commission and postage	39	28
Dec. 1.	H. C. Major, commission...	4	90

ESTATE OF ISAAC W. GREENWOOD.

1920.			
June 1.	To H. C. Major, commission...	$ 31	53

ESTATE OF LOUISE W. GILLIS.

1920.			
Oct. 27.	To Copy of letters and filing same	$ 1	50
Nov. 1.	J. S. Clute, legal	23	45
	H. C. Major, commission and postage	24	00
Dec. 1.	"Columbian," advertising..	4	62
	J. S. Clute	6	50
	Al. W. Gillis	394	93

ESTATE OF JULIA HARRIS.

1920.			
Oct. 25.	To Registrar, duty	$ 474	79
Nov. 11.	A. F. Harris, husband	500	00
	English & Brown, premium on bond	5	00
	H. C. Major, commission...	61	76

ESTATE OF JOHN JONES.

1920.			
May 25.	To Cash, clerk at auction	$ 5	00
June 3.	E. Pope, funeral	16	00
	H. S. Meth, auto	5	00
	J. C. Machenney, printing..	3	00
	Wm. Storey, merchandise...	20	68
	Harron Bros., casket	55	00
July 6.	Whiteside, Edmonds, legal..	41	95
	"Columbian," advertising..	3	60
Sept. 18.	1920 taxes, Maple Ridge ...	5	02
Nov. 18.	Copy of letters and filing same	2	50
Dec. 1.	H. C. Major, commission and postage	28	25

ESTATE OF E. W. KING.

1920.			
Jan. 24.	To H. C. Major, commission...	$ 124	92
Mar. 1.	Wm. Merryfield	25	00
	Merryfield Bros.	34	20

ESTATE OF THEODOR CHRISTIAN KEMPRUD.

1920.			
Jan. 22.	To G. Kemprud, father, on account	$ 250	00
Feb. 3.	1918-19-20 taxes, Athalmer lots	42	68
Feb. 19.	H. C. Major, copy of letters „ filing deed ...	1	00
		5	50
Oct. 30.	Bank charges *re* collection..	4	00
Nov. 5.	G. Kemprud, father	200	00
	Drs. Ridge & Dawson	150	00
	Mount Pleasant Undertaking Co.	309	00
Dec. 1.	H. C. Major, commission...	98	93
	„ stationery, postage, and letters	1	50

CR.

ESTATE OF HARRY GOODFELLOW.

1920.			
Oct. 5.	By Wright, principal	$ 500	00
	„ interest	30	00
	„ balance of principal	300	00

ESTATE OF EDWIN GARDNER.

1920.			
April 14.	By Sale of drum	$ 12	50

ESTATE OF WILLIAM GRAHAM.

1920.			
Feb. 27.	By Official Administrator at Cumberland	$ 9	50
	Bank of Montreal	306	24
Mar. 4.	B.C. Mills, wages	460	00
June 1.	Sale of bonds	98	00

ESTATE OF ISAAC W. GREENWOOD.

1920.			
April 23.	By Gray, account of principal..	$ 100	00
	„ interest to May 12th, 1920	8	00

ESTATE OF LOUISE W. GILLIS.

1920.			
Oct. 19.	By Huggan, account sale of lot	$ 10	00
Oct. 27.	„ balance of purchase price	465	00

ESTATE OF JULIA HARRIS.

1920.			
Oct. 25.	By Bank of Montreal	$1,235	52

ESTATE OF JOHN JONES.

1920.			
May 25.	By E. Pope from auction	$ 238	55
June 15.	Bank of Montreal, Haney..	171	55
Nov. 18.	Jno. Reid, sale of lot	142	50
Nov. 29.	Dividend, Dominion Trust..	9	44

ESTATE OF THEODOR CHRISTIAN KEMPRUD.

1920.			
Oct. 30.	By Tyson, *re* land-sale	$ 525	00
	„ interest on same ...	203	00
	„ *re* land-sale	323	00
	„ interest to Oct. 21st, 1920	314	30
	Bank interest	30	89
Nov. 24.	Fisher, note	75	75

ESTATE OF DAVID KRISTOFFERSEN.

1920.			
June 9.	To "Columbian," advertising	$	4 80
	Corbould & Grant, legal		59 27
June 21.	Johnson & Hamilton, funeral		237 50
Sept. 25.	Dr. T. Torland		150 00

ESTATE OF ROWLAND VINCENT KEVIS.

1920.			
June 24.	To Arrears of taxes	$	33 38
July 6.	S. Bowell, funeral		65 00
	"Columbian," advertising		3 36
	H. N. Lidster, legal		19 30
	H. C. Major, commission		12 50
	Mental Hospital		116 46

ESTATE OF JOHN LONGO.

1920.			
Jan. 7.	To R. A. Braden, legal	$	51 60
Jan. 13.	"Columbian," advertising		3 00
Jan. 24.	City of New Westminster, taxes, 1918–19		36 80
Aug. 19.	R. A. Braden		32 54
Sept. 17.	City taxes, 1920		32 40
Dec. 1.	Taxes, D.L. 2989, 1920–21		6 20
	H. C. Major, commission and postage		24 86

ESTATE OF C. LAMBERT.

1920.			
June 1.	To H. C. Major, commission and postage	$	0 70

ESTATE OF WILLIAM LAING.

1920.			
June 1.	To H. C. Major, commission and postage	$	11 10

ESTATE OF JOHN A. LEWIS.

1920.			
Mar. 1.	To L. A. Lewis, son	$	98 00
	Elsie Skillen, daughter		382 37

ESTATE OF LOUISA LYONS.

1920.			
Dec. 30.	To Bank of Montreal, transferring	$	5 00

ESTATE OF HEWEN MIDDLETON.

1920.			
Mar. 4.	To Attorney-General	$	49 40
	H. C. Major		2 60

ESTATE OF FRANK PHILLIP MALZARD.

1920.			
Dec. 6.	To Petapiece, legal	$	30 41
	Petan, balance on car		127 00
Dec. 30.	Storage on car		3 80

ESTATE OF PATRICK J. MURPHY.

1920.			
June 1.	To H. C. Major, commission	$	0 54

ESTATE OF MAROANA MASEAS.

1920.			
Mar. 1.	To Felip M. Borquez, brother	$	91 01

ESTATE OF TOMMY MARTIEL.

1920.			
May 19.	To One-half share of mortgage	$	677 30
	Legal expenses acting for father		89 70
June 1.	"Columbian," advertising		9 45
	H. C. Major, commission and postage		100 50
Sept. 1.	Daykin & Burnett, for father		1,123 05

ESTATE OF WILLIAM MORAN.

1920.			
Dec. 1.	To H. C. Major, commission	$	43 53

ESTATE OF ISAAC J. MADDAUGH.

1920.			
June 1.	To H. C. Major, commission and postage	$	0 65
Sept. 1.	Lewis, bond		10 00
Oct. 29.	Surrey Municipality, taxes, 1919–20		17 30
Dec. 1.	H. C. Major, commission		1 07

ESTATE OF DAVID KRISTOFFERSEN.

1920.			
May 31.	By Cash in shack	$	26 50
	Bank of Montreal		2,135 78
June 4.	Sale of bond		99 00

ESTATE OF ROWLAND VINCENT KEVIS.

1920.			
June 24.	By Sale of property	$	250 00

ESTATE OF JOHN LONGO.

1920.			
Jan. 2.	By Wages	$	172 95
May 3.	Small & Bucklin, *re* land-sale		150 00
Nov. 4.	Sale of bond		50 00

ESTATE OF LOUISA LYONS.

1920.			
Dec. 22.	By N. E. Ford, merchandise sales	$	930 47
	" book accounts		110 05
Dec. 30.	Bank of Montreal		2,074 86
	Deposited by Ford		2,458 23

ESTATE OF HEWEN MIDDLETON.

1920.			
Feb. 10.	By Shepherd, interest to Feb. 20th, 1920	$	52 00

ESTATE OF FRANK PHILLIP MALZARD.

1920.			
Nov. 24.	By Fullerton Construction Co., wages	$	40 77
	Sale of car		225 00

ESTATE OF TOMMY MARTIEL.

1920.			
May 19.	By sale of land	$2,000	00

ESTATE OF WILLIAM MORAN.

1920.			
Oct. 25.	By Canadian Bank of Commerce	$	870 76

ESTATE OF ISAAC J. MADDAUGH.

1920.			
June 17.	By Dividend, G.G. Association	$	1 50
Sept. 7.	" "		2 00
Oct. 5.	Sale of Grain-growers' stock		18 00
Nov. 11.	Refund on taxes		4 20

DR.

ESTATE OF JESSE JAMES MONKMAN.

1920.			
July 22.	To Lizzie J. Monkman	$	175 00
Aug. 4.	Water rate to Sept. 30th		5 00
	Savage, making two culverts		8 75
	Point Grey taxes, Lot 13, Bk. 15, D.L. 318		25 60
	Point Grey taxes, Lot 15, E. pt. 6 and S. ½ 7, D.L. 325		20 00
	Point Grey taxes, Lot 3		38 34
	J. Wilcox, auto for funeral		5 00
	Dr. King		6 00
	Murchie & Son, funeral		153 50
	"Columbian," advertising lost will		4 32
	Delta taxes, Lot 115		25 74
	" 118		125 28
Aug. 9.	"Columbian," advertising		20 16
Aug. 10.	Point Grey water rates		3 37
Sept. 1.	A. W. McLeod, insurance		21 50
	L. R. Hodgson, repairs to fence		27 45
	"Province," advertising		15 75
	Point Grey "Gazette," advertising		13 44
Sept. 13.	"Columbian," advertising		20 16
Oct. 6.	Water rate		5 25
Nov. 26.	Lizzie Monkman, on account		100 00
Dec. 1.	H. C. Major, commission and sundries		138 76
Dec. 6.	Fashion Livery, auto		5 00
Dec. 11.	Point Grey water rates		3 15

ESTATE OF SAMUEL MCLEAN.

1920.			
June 1.	To H. C. Major, commission and postage	$	64 96
June 29.	Taxes, 1920		8 28

ESTATE OF MATTHEW MCCAULEY.

1920.			
June 1.	To H. C. Major, commission	$	0 45

ESTATE OF MURDOCK MCKENZIE.

1920.			
July 31.	To 1920 taxes	$	10 75

ESTATE OF ALEX. F. MCDONALD.

1920.			
Nov. 21.	To "Columbian," advertising	$	3 60
	Expenses, trip inspection to Hope		18 95
Dec. 1.	H. C. Major, commission		25 00

ESTATE OF MASAJIRO NISHIMURA.

1920.			
Mar. 1.	To Pearson & Co., insurance	$	32 50
June 1.	H. C. Major, commission		23 18
	Pearson & Co., insurance		33 50
	Tatsu, carpenters, shingling		60 00
	" material for repair		90 85
Oct. 1.	Taxes, 123 Columbia Street		33 10
Nov. 11.	Repairs		6 60
Dec. 1.	H. C. Major, commission		7 77

ESTATE OF VIOLA EVA NORMAN.

1920.			
May 4.	To Notary, two trips to Vancouver	$	2 00
June 1.	"Columbian," advertising		5 28
	Corbould & Grant, legal		26 80
	Eliz. M. Bell, nurse		6 00
	Can. Fin. Trust, two graves		66 00
	Dr. Carswell		60 00
	R.C. Hospital		30 50
	Center & Hanna, funeral (two)		253 25
	H. C. Major, commission		44 40
Nov. 12.	Ethel Tomlinson, guardian		393 94

ESTATE OF JOHN WILLIAM NICHOL.

1920.			
Oct. 25.	To Registrar, duty	$	7 00
Oct. 30.	Canadian Bank of Commerce, collection charges		3 30
Nov. 1.	Ellis & Brown, legal		41 80
	H. C. Major, commission and postage		42 00
Nov. 20.	Ellis & Brown		27 90

CR.

ESTATE OF JESSE JAMES MONKMAN.

1920.			
July 22.	By Royal Bank, Vancouver	$	868 05
July 28.	Royal Bank, Ladner		1,310 81
Aug. 2.	Rent, Johns, July 12th		15 00
Aug. 4.	Sale of grass-cutter, etc.		16 00
Aug. 6.	Bond and interest		55 88
	Johns, rent to Aug. 12th, 1920		15 00
	J. M. Follis, posts, lumber, etc.		12 00
Aug. 11.	J. M. Usher, interest to June 1st		60 00
Aug. 17.	Johns, rent to Sept. 12th, 1920		15 00
Sept. 4.	T. F. Higgs, for horse		70 00
	F. Hanford, horse and buggy		41 00
	A. Wood, chains and harness		6 50
Sept. 18.	Johns, rent to Oct. 12th		15 00
Oct. 5.	Hodgson, rent to Oct. 1st		200 00
Oct. 15.	Johns, rent to Nov. 12th		15 00
Nov. 15.	" Dec. 12th		15 00
Nov. 20.	Chinaman, account rent		20 00
Dec. 13.	Johns, rent to Jan. 12th		15 00
Sept. 4.	Hodgson, wagon-rack		5 00

ESTATE OF ALEX. F. MCDONALD.

1920.			
Oct. 13.	By Pacific Tire & Timber Co.	$	100 00
	" "		400 00

ESTATE OF MASAJIRO NISHIMURA.

1920.			
Mar. 1.	By Rent, Lulu Island lot	$	2 00
Mar. 20.	Tatsu, rent to March 31st, 1920		43 00
April 19.	Rent, Lulu Island		2 00
June 2.	" to Dec. 31st		16 00
June 9.	Tatsu, rent, April, May, and June		60 00
Sept. 20.	Tatsu, rent, July, August, and September		49 50
Nov. 11.	Tatsu, rent, October and November		30 00

ESTATE OF VIOLA EVA NORMAN.

1920.			
May 4.	By Life Insurance Co.	$	867 29
	Refund, electric light		2 00
	Balance life insurance		18 88

ESTATE OF JOHN WILLIAM NICHOL.

1920.			
Oct. 30.	By Bank of Hamilton	$	836 57

DR.

ESTATE OF JOSEPH PROVOST.

1920.			
Jan. 2.	To Legal, including commission to brother	$ 463	66
Feb. 3.	H. C. Major, commission	158	20
	Attorney-General	1,216	35

ESTATE OF JOHN PLACHAT.

1920.			
June 1.	To H. C. Major, commission	$ 4	15
June 8.	Murchie, funeral	50	00

ESTATE OF HERMAN PEARSON.

1920.			
Oct. 15.	To W. E. Fales, funeral	$ 75	00
	Mental Hospital	19	00
	H. C. Major, commission	7	94

ESTATE OF ANNIE M. PLEWS.

1920.			
Jan. 2.	To Blackstock, purchase	$ 4	00
	Copy of letters of administration	1	00
Feb. 5.	H. C. Major, commission	59	38
Feb. 6.	Geo. Blackstock, arrears of water	2	00

ESTATE OF OLLE PEDERSON.

1920.			
June 1.	To H. C. Major, commission	$ 0	40

ESTATE OF ARTHUR PECK.

1920.			
May 14.	To One-half ditching-tax	$ 26	50
	Copy of letters	1	00
	Exchange on cheque		95
Jan. 1.	Duncan Cameron	25	00
	Dr. Drew	45	00
	St. Mary's Hospital	15	75
	Whiteside, Edmonds, legal	25	05
	H. C. Major, commission	40	00
	Auto to farm and postage	5	25
	E. A. Wilson, funeral	100	00
	Telegram		75

ESTATE OF JOHN HENRY QUENAULT.

1920.			
Dec. 7.	To Bringing in effects	$ 5	00

ESTATE OF THOMAS READ.

1920.			
July 16.	To Probate and succession duty	$ 349	43
	Original and three office copies	5	00
Aug. 9.	"Columbian," advertising	14	40
	E. W. Bigelon, legal	58	35
Sept. 15.	1920 taxes, Third Avenue	6	68
	H. C. Major, final payment	326	00
Oct. 11.	"Columbian," *re* C. of T	10	00
Oct. 30.	Registration of deed	6	80
	Notary work	1	00
Dec. 1.	H. C. Major, commission, postage, and auto	238	08

ESTATE OF JAMES H. RANKIN.

1920.			
Dec. 1.	To H. C. Major, commission and postage	$ 5	87

ESTATE OF HEIKKI SUNI.

1920.			
Jan. 23.	To Registrar, Supreme Court	$1,447	71

ESTATE OF RUSSELL SMITH.

1920.			
Feb. 5.	To H. C. Major, commission	$ 107	38

ESTATE OF ALBERT PETER HANS SWANSON.

1920.			
April 16.	To H. A. Eastman, valuator	$ 7	00
Oct. 22.	Taxes and costs, two years	181	06
	Filing copy of letters		50
	Taxes, Surrey, and costs, two years	35	32
Dec. 1.	H. C. Major, commission	161	87
	Postage		50
	Three trips to property (auto)	5	00

CR.

ESTATE OF JOSEPH PROVOST.

1920.			
Jan. 2.	By Sale of farm	$1,800	00

ESTATE OF JOHN PLACHAT.

1920.			
April 23.	By Matheson, police	$ 83	05

ESTATE OF HERMAN PEARSON.

1920.			
Aug. 30.	By Cash from Mental Hospital	$ 158	85

ESTATE OF ANNIE M. PLEWS.

1920.			
Jan. 2.	By Williams, rent to Jan. 25th	$ 4	00
	Blackstock, sale of Lot 5/6/91	400	00

ESTATE OF ARTHUR PECK.

1920.			
May 14.	By Bray, sale of Langley property	$ 800	00

ESTATE OF JOHN HENRY QUENAULT.

1920.			
Dec. 7.	By Brunette Saw Mills, wages	$ 175	11
	Burnaby police	8	70
	Sale of blankets, etc.	7	59

ESTATE OF THOMAS READ.

1920.			
July 22.	By Bank of Montreal, Port Haney	$1,311	74
Oct. 30.	Morris, on account land-sale	105	00
Nov. 12.	" balance *re* land-sale	2,695	00
Nov. 29.	War certificates	500	00

ESTATE OF JAMES H. RANKIN.

1920.			
Sept. 7.	By Dividend, Grain-growers' Association	$ 10	00
Oct. 5.	Sale of Grain-growers' stock	90	00

ESTATE OF OSCAR RENAND.

1920.			
Dec. 28.	By Mental Hospital	$ 70	00

ESTATE OF ALBERT PETER HANS SWANSON.

1920.			
Mar. 17.	By Sale of effects	$ 30	00
Mar. 23.	Attorney-General	1,791	70
Mar. 26.	Moore, account sale of Lot 56	320	00
Oct. 22.	A. E. Vert, sale of lots	700	00
Oct. 28.	S. F. Mark, Lot 12, Bk. 7, D.L. 30	75	00
Nov. 1.	Moore, balance *re* Lot 56	310	00
	" interest in full	10	85

DR.

ESTATE OF ROBT. WILSON SHANKS.

1920.			
June 4.	To Transfer fee, bonds	$	2 00
July 6.	J. Loney, funeral		185 00
	Dr. McEwen		65 50
	"Columbian," advertising		5 40
	H. C. Major		25 88
July 16.	F. D. Sinclair		37 00
Dec. 6.	Corbould & Grant, legal		23 50

ESTATE OF INDAR SINGH.

1920.			
July 6.	To Lidster, legal	$	30 35
	"Columbian," advertising		4 32
Dec. 1.	H. C. Major, commission and postage		147 00

ESTATE OF HARRY SHAW.

1920.			
July 7.	To 1920 taxes	$	9 60

ESTATE OF HENRY SCOREY.

1920.			
Jan. 7.	To McQuarrie & Martin	$	10 00
	C. G. Major, commission		78 26
	E. Davies, taxes		39 06
	Sarah Davies, heir		387 79
	Maud Sharp, heir		387 79
	Martin L. Shook, heir		129 26
	Lillian Shook, heir		129 26
	Florence Shook, heir		129 27

ESTATE OF ALICE THORNE.

1920.			
Jan. 2.	To Bonds purchased	$	709 04
Jan. 15.	H. C. Major, commission		45 98
Jan. 20.	Mental Hospital		125 71
Feb. 25.	Commission on rentals		5 00
	Water		5 10
	Plumbing		5 50
April 16.	Mental Hospitals to March 31st		102 25
June 1.	Paid for bonds		100 00
June 4.	"		100 00
	"		500 00
June 5.	"		1,300 00
June 22.	Plumber		2 00
	Relining bath		26 00
	Commission on rents		6 50
July 16.	Vancouver taxes		144 46
July 28.	Mental Hospital		106 65
Aug. 6.	Paid for bond		50 00
Sept. 22.	H. C. Major, for bond		38 50
Oct. 13.	Calland, repairs		186 95
	Mental Hospitals to Sept. 30th		105 30
Dec. 16.	Self, Christmas		200 00
Dec. 22.	Commission on rentals		10 50
	Water rates and repairs		66 00

ESTATE OF J. TSITSILIOS.

1920.			
Oct. 1.	To H. C. Major, commission and postage	$	2 25
	G. Tsitsilios, funeral		40 50

ESTATE OF WILLIAM THOMAS.

1920.			
June 1.	To H. C. Major, commission and postage	$	54 41
Oct. 30.	Taxes, 1920		21 67

ESTATE OF YANO TAKA.

1920.			
June 1.	To H. C. Major, commission and postage	$	30 77

ESTATE OF SAMATSU TAMURA.

1920.			
Jan. 22.	To Funeral	$	156 50
	Doctor		10 00
	Murato Taxi Co.		22 50
	W. Storey		25 55
	Merchandise		6 15
	Exchange		15
Mar. 1.	J. W. Dixie, legal		38 35
	H. C. Major, commission		15 00
	Copy of letters and postage		1 25

CR.

ESTATE OF ROBT. WILSON SHANKS.

1920.			
April 23.	By Interest on bonds	$	13 75
June 4.	Bank		8 96
	Sale bonds		495 00

ESTATE OF INDAR SINGH.

1920.			
June 23.	By Two cheques, Compensation Board	$	94 06
July 6.	Royal Bank		2,839 59

ESTATE OF ALICE THORNE.

1920.			
Jan. 2.	By Sutcliffe, principal and interest	$	704 60
	Hubbard, account land-sale		50 00
Jan. 15.	Reid, interest to Jan. 5th		24 00
Feb. 10.	Ingle, interest to March 23rd		68 00
Feb. 25.	Calland, rentals to March 20th		100 00
Feb. 27.	Jenks, interest to Feb. 29th		40 00
	" account principal		35 00
April 8.	Hubbard, account land-sale		50 00
June 1.	Reid, interest, April 5th, 1920		24 00
	Interest on bonds		162 25
June 4.	Simpson, interest to June 5th		38 00
	Wilson, interest to May 17th		750 00
June 5.	Reid, interest to date		8 00
	" principal in full		1,200 00
June 22.	Rent to July 20th		130 00
July 8.	Jenks, account principal		34 20
	" interest to June 30th		25 80
Aug. 6.	Hubbard, on account		50 00
Aug. 20.	Riddle, interest to Sept. 23rd		68 00
Nov. 2.	Interest on bonds		7 83
Nov. 22.	Simpson, interest to Dec. 5th		38 00
Nov. 23.	Jenks, account principal		22 75
	" interest to Dec. 31st		37 25
Dec. 1.	Bond interest		154 00
Dec. 6.	Hubbard, account land-sale		75 00
Dec. 22.	Calland, rentals to Jan. 20th		210 00

ESTATE OF J. TSITSILIOS.

1920.			
Sept. 18.	By Can. West. Lbr. Co.	$	42 75

ESTATE OF WILLIAM THOMAS.

1920.			
Jan. 2.	By Lomas, balance *re* land-sale	$	250 00

ESTATE OF SAMATSU TAMURA.

1920.			
Jan. 22.	By Sale of interest in land	$	300 00

DR.

ESTATE OF ERNEST UOTILA.

1920.			
Oct. 13.	To E. J. Rothwell	$	75 41
	Wm. Kask		133 59
	J. D. Kennedy		24 50
	Mental Hospital		4 00
	S. Bowell Co.		101 00
	Royal Columbian Hospital		12 75
	Columbian Co.		3 60
	H. C. Major, commission and postage		19 00

ESTATE OF JOSEPH VOGEL.

1920.			
Oct. 6.	To 1920 tax	$	8 75
	Assessor Rowland, *re* advertising		3 00

ESTATE OF A. M. WALKER.

1920.			
Jan. 30.	To Burnaby, redemption of lot	$	51 65
Feb. 9.	Dr. Rothwell		40 00
	R.C. Hospital		32 00
	Corbould & Grant		38 90
	S. Bowell		44 00
	W. S. Marshall		50 00
	J. P. Walker		282 00
	H. C. Major, commission		30 80

ESTATE OF ALICE MAUD WORDSWORTH.

1920.			
April 30.	To Exchange	$	0 50
Dec. 1.	H. C. Major, commission		58 76

ESTATE OF SAMUEL H. YOUNG.

1920.			
Nov. 20.	To McQuarrie & Martin, legal	$	50 00
	H. C. Major, commission		45 34
	„ sundries		50
	Mary C. Young		270 38
	Florence E. Wheeker		270 36
	Samuel D. Young		270 36

CR.

ESTATE OF ERNEST UOTILA.

1920.			
Aug. 30.	By Mental Hospital	$	473 85

ESTATE OF A. M. WALKER.

1920.			
Jan. 30.	By J. P. Walker, advanced	$	250 00
April 15.	Sale of Burnaby property		600 00

ESTATE OF ALICE MAUD WORDSWORTH.

1920.			
Mar. 22.	By Bank of Montreal, England	$	5 91
April 30.	Mrs. Kidd, account land-sale		350 00
	„ interest to date		56 00
Nov. 4.	„ account principal		50 00
	„ interest		15 75

ESTATE OF SAMUEL H. YOUNG.

1920.			
Oct. 28.	By Canadian Bank of Commerce	$	906 94

H. C. MAJOR,
Official Administrator.

OKANAGAN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN CONNELL.

1920.			
May 31.	To Campbell Bros.	$	115 00
	Grave-digging		10 00
	Car-hire at funeral		3 00
	Priests's attendance and car		20 00
	Dr. Arbuckle		40 00
	Hospital account		16 00
	Shields & Co.		4 00

1920. ESTATE OF WILLIAM MATIER.

May 5.	To Mr. Macintosh as attorney for heirs	$	1,449 52

CR.

ESTATE OF JOHN CONNELL.

1920.			
May 31.	By Amount of cash found on person	$	51 93
	Cheque, Yuill & Knight, balance of wages		290 00

1920. ESTATE OF THOMAS JOHNSTON.

Jan. 4.	By Cheque, Mrs. Barnes, balance owing on chattel mortgage	$	196 35

1920. ESTATE OF K. KAGAMI.

April 26.	By Cash, Chief Carter	$	55 92
	„ Sale of chattels		39 00
June 15.	„ Sale of Victory bonds		424 97

1920. ESTATE OF JOHN LLOYD.

Jan. 4.	By Draft, Garbutt, interest on sale agreement	$	180 00

ARTHUR COCHRANE,
Official Administrator.

OMINECA MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN BARRETT.

1920.			
Mar. 6.	To Voucher	$	1 45
May 21.	"		1 13

ESTATE OF ERNEST SARSONS CHEATLE.

1920.			
Mar. 6.	To Voucher	$	4 00
May 21.	"		12 00
	"		37 57
July 3.	"		95

ESTATE OF JULIUS NELS CARLSON.

1920.			
April 12.	To Voucher	$	16 06
May 10.	"		5 84
	"		10 05
May 15.	"		5 00
Oct. 23.	"		30
Nov. 3.	"		25 00
	"		91 02

ESTATE OF GEORGE DUMNEL.

1920.			
May 10.	To Voucher	$	1 68
June 10.	"		3 30
	"		6 98
	"		70 00
July 3.	"		14 00
Sept. 7.	"		1 17
Oct. 23.	"		37 50
	"		85 06
Nov. 3.	"		5 40
Nov. 13.	"		10 00
	"		10 00
	"		15 00
	"		8 75
	"		47 00
	"		21 50
	"		16 50
Nov. 18.	"		25 00
	"		10 00

ESTATE OF GEORGE FINDLAY.

1920.			
Mar. 6.	To Voucher	$	0 90
April 12.	"		47 84
	"		5 00
May 10.	"		27 49
Nov. 13.	"		5 00

ESTATE OF HELGE G. HANSON.

1920.			
Dec. 4.	To Voucher	$	24 40
	"		70 00
	"		420 08

ESTATE OF AUGUST HATT.

1920.			
Mar. 6.	To Voucher	$	75 80
Mar. 17.	"		6 20
Mar. 24.	"		5 60
	"		131 65
July 24.	"		8 43
	"		65 11
	"		136 11
	"		136 09
	"		136 09
	"		136 09
	"		136 09
	"		136 09
	"		136 09
	"		136 09
	"		45 37
	"		30 25
	"		30 25
	"		30 25

ESTATE OF GEO. PATRICK HAZELTON.

1920.			
May 2.	To Voucher	$	7 65
Dec. 1.	"		12 80
	"		607 34

CR.

ERNEST SARSONS CHEATLE.

1920.			
Jan. 1.	By W. S. Henry	$	79 00

ESTATE OF JULIUS NELS CARLSON.

1920.			
Jan. 14.	By Buda Co.	$	50
Mar. 26.	G.T.P. Tel. Co.		116 87
Sept. 20.	E. E. Orchard		6 00

ESTATE OF GEORGE DUMNEL.

1920.			
April 8.	By Workmen's Comp. Board	$	33 15
April 23.	Hudson's Bay Co.		45
May 10.	Thorp & Hoops		139 60
July 9.	Provincial Police		10 00
July 22.	G.T.P. Rly. Co.		13 50
Sept. 7.	Royal Bank of Canada		750 02

ESTATE OF GEORGE FINDLAY.

1920.			
Jan. 3.	By F. B. Chettleburgh	$	18 00
Mar. 20.	Union Bank		549 80

ESTATE OF HELGE G. HANSON.

1920.			
Nov. 22.	By Union Bank	$	488 00

ESTATE OF AUGUST HATT.

1920.			
Jan. 1.	By S. Bergman	$	385 00
Jan. 29.	"		1,131 00

DR.

ESTATE OF PERCY G. HEWITT.

1920.		
Jan. 2.	To Voucher	$ 6 15
Jan. 16.	„	454 79
	„	36 60
	„	29 50
	„	1 50

ESTATE OF FRED. S. W. JENNINGS.

1920.		
April 12.	To Voucher	$ 7 20
May 10.	„	60

ESTATE OF CARL JOHNSON.

1920.		
May 14.	To Voucher	$ 61 75

ESTATE OF WALTER JOHNSON.

1920.		
May 10.	To Voucher	$ 5 15
	„	40 00

ESTATE OF JOHN ERIC LINDQUIST.

1920.		
Jan. 2.	To Voucher	$ 1 00
May 10.	„	2 48
Sept. 7.	„	1 01
Oct. 23.	„	1 00
Dec. 4.	„	1 00

ESTATE OF ROBERT FINLAYSON MACKAY.

1920.		
April 12.	To Voucher	$ 62 50

ESTATE OF GEORGE MOORE.

1920.		
Oct. 23.	To Voucher	$ 41 00
	„	720 85
	„	47 50
Nov. 3.	„	5 80
Dec. 4.	„	25 00
	„	1 00
	„	66 10
Dec. 31.	„	37 50
	„	12 00
	„	13 70
	„	41 00
	„	48 62
	„	15 00
	„	29 00
	„	160 00
	„	214 39
	„	30 00
	„	6 00
	„	35 00
	„	96 00
	„	12 00
	„	40 91

ESTATE OF WILLIAM MCAVOY.

1920.		
Jan. 2.	To Voucher	$ 41 07
Jan. 7.	„	8 00
April 3.	„	772 43

ESTATE OF ALLANA MCMILLAN.

1920.		
Mar. 12.	To Voucher	$ 6 75

ESTATE OF ALEXANDER MCPHEE.

1920.		
Oct. 23.	To Voucher	$ 8 15
	„	5 00
	„	1 72
	„	25 30

ESTATE OF ERIC PEDERSON.

1920.		
May 12.	To Voucher	$ 44 94
May 20.	„	2 00
	„	2 75
	„	7 33
Dec. 27.	„	11 65
	„	705 28

ESTATE OF ALFRED E. PLAYER.

1920.		
May 10.	To Voucher	$ 4 98

ESTATE OF JAMES GILBERT POWELL.

1920.		
July 14.	To Voucher	$ 25 00
Sept. 7.	„	1 73
	„	508 02

CR.

ESTATE OF FRED. S. W. JENNINGS.

1920.		
Mar. 12.	By Mrs. F. W. Jennings	$ 7 20
April 16.	Mrs. A. Rowe	12 00

ESTATE OF WALTER JOHNSON.

1920.		
April 17.	By Dr. H. C. Wrinch	$ 103 10

ESTATE OF JOHN ERIC LINDQUIST.

1920.		
April 5.	By A. Leverett	$ 49 75
July 22.	„	20 25
Sept. 20.	„	20 00
Nov. 22.	„	20 00

ESTATE OF ROBERT FINLAYSON MACKAY.

1920.		
Mar. 20.	By City of Prince Rupert	$ 0 85
Mar. 26.	Miss J. MacKay	69 30

ESTATE OF GEORGE MOORE.

1920.		
Sept. 20.	By Trusts Guarantee, Calgary	$ 820 15
Nov. 15.	D. A. McRae	500 00
Dec. 31.	„	750 00

ESTATE OF ALEXANDER MCPHEE.

1920.		
Sept. 20.	By Constable Cline	$ 1 00
Sept. 29.	Magaffin & Co.	162 00

ESTATE OF ALFRED E. PLAYER.

1920.		
April 23.	By W. S. Harris	$ 99 75

ESTATE OF JAMES GILBERT POWELL.

1920.		
June 2.	By Soldiers' C.R.	$ 500 00
July 26.	D. R. Willemar	34 75

DR.

ESTATE OF BERT SCHOOLING.

1920.			
Jan. 2.	To Treasury	$	10 00

ESTATE OF IRA LOUIS SLEEPER.

1920.			
May 10.	To Voucher	$	24 36
May 12.	„		29 05
	„		5 00
	„		35 00
	„		25 00
	„		10 00
May 21.	„		40 00
June 10.	„		25
June 11.	„		6 44
Oct. 28.	„		105 95
	„		52 97
	„		52 97
	„		52 97
	„		52 99

ESTATE OF THOMAS G. SLOAN.

1920.			
Jan. 9.	To Voucher	$	711 48
	„		711 48

ESTATE OF ALBERT SOMERVILLE.

1920.			
Jan. 14.	To Voucher	$	5 20
	„		60 00
	„		25 00
	„		1 50
	„		1 90
Mar. 3.	„		26 95
Mar. 6.	„		82 76
April 27.	„		6 00
	„		625 29
	„		625 29
	„		625 29
	„		625 28

ESTATE OF ALONZO WILSON STULTS.

1920.			
May 10.	To Voucher	$	10 00

ESTATE OF VICTOR R. SWANSON.

1920.			
May 21.	To Voucher	$	15 44
Oct. 23.	„		35 25

ESTATE OF LOUIS WESTER.

1920.			
Feb. 4.	To Voucher	$	47 38
Mar. 6.	„		45 86
Mar. 15.	„		9 83
	„		40 00
	„		5 60

ESTATE OF ROBERT WRIGHT.

1920.			
Jan. 2.	To Voucher	$	14 66
May 10.	„		25

ESTATE OF KARAL ZINKOVITCH.

1920.			
Oct. 23.	To Voucher	$	0 78
Dec. 4.	„		4 45
	„		62 50
	„		25 00
Dec. 31.	„		2 08

CR.

ESTATE OF IRA LOUIS SLEEPER.

1920.			
Jan. 26.	By Cash in effects	$	1 75
April 27.	Royal Bank of Canada		487 20
May 10.	Constable service		5 00

ESTATE OF ALBERT SOMERVILLE.

1920.			
Mar. 3.	By Provincial Treasury	$	138 50

ESTATE OF ALONZO WILSON STULTS.

1920.			
Mar. 26.	By Olaf Hanson	$	200 00

ESTATE OF VICTOR R. SWANSON.

1920.			
Sept. 24.	By James Adams	$	705 00

ESTATE OF LOUIS WESTER.

1920.			
Jan. 16.	By Union Bank of Canada	$	917 32

ESTATE OF ROBERT WRIGHT.

1920.			
Mar. 3.	By J. Kelly	$	5 00

ESTATE OF KARAL ZINKOVITCH.

1920.			
Sept. 20.	By Cash on body	$	15 65
Oct. 23.	G.T.P. Rly.		89 00
Dec. 27.	„		41 78

STEPHEN H. HOSKINS,
Official Administrator.

REVELSTOKE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GEORGE S. ADAMS.

1920.			
June 23.	To Provincial tax-collector	$	49 60

CR.

DR.

ESTATE OF SABAD ALLI.

1920.			
April 19.	To Howson Undertaking Parlors	$ 233	90
	Official Administrator	1	53
	Revelstoke Hospital Society	18	75
July 31.	W. I. Briggs	31	20
	Sutherland & Hamilton	200	00
	Probate duty	48	34
	Revelstoke "Review"	6	00
	Babco Resedeus	86	75
	Nakusp Trading Co.	29	65
	G. W. Jordan	3	65
	Santa Singh	30	00

ESTATE OF BENJAMIN F. GAYMAN.

1920.			
June 26.	To Revelstoke "Review"	$	6 00
	Probate duty		2 00
	Commission (Administrator)		75 00
	G. W. Bell, Ltd.		14 50
	Sutherland & Hamilton		75 00
	Howson's Undertaking Parlors		238 50
	W. I. Briggs		30 30
	Mrs. A. Maddock		89 75
Nov. 4.	City of Revelstoke		4 40
	L. A. Howson		67 50

ESTATE OF REBECCA HARVEY.

1920.			
Feb. 23.	To Commission (Administrator)	$	1 00
April 29.	E. G. Burridge & Son		96 40
Aug. 27.	City of Revelstoke		52 19

ESTATE OF HERBERT HEFFREN.

1920.			
June 28.	To W. I. Briggs	$	27 95
	Probate duty		3 00
	Commission (Administrator)		7 50
	Geo. Chapman		111 55

ESTATE OF HENRY B. KIRK.

1920.			
April 19.	To Probate duty	$	1 00
	Henry Kirk		141 00
Dec. 29.	Commission (Administrator)		7 50

ESTATE OF ROBERT L. MCCONVILLE.

1920.			
Feb. 23.	To Revelstoke "Review"	$	6 40
June 28.	Howson's Undertaking Parlors		108 50
July 31.	Mrs. W. G. Beasley		465 98
	G. L. Dahl, trustee		465 97

ESTATE OF JOHN OLM.

1920.			
April 19.	To Probate duty	$	42 05
	W. I. Briggs		41 25
May 18.	Herbert Olm		3,647 99
	Commission (Administrator)		201 64
	Adams River Lumber Co.		99 93
Dec. 29.	Commission (Administrator)		10 40

ESTATE OF ERNEST GUSTAF SEDERBERG.

1920.			
Nov. 28.	To Commission (Administrator)	$	15 27
	Revelstoke "Review"		6 00
	A. Wilson		7 50
	W. I. Briggs		34 20
	L. A. Howson, undertaker		174 60

ESTATE OF SOO LUNG YOU.

1920.			
Feb. 23.	To Commission (Administrator)	$	16 87
	Wing Chung		15 85
	W. I. Briggs		28 70
	Probate duty		16 87
	Revelstoke "Review"		6 00

ESTATE OF JOHN SWEENY.

1920.			
April 19.	To W. I. Briggs	$	31 20
	Probate duty		30 49
	Sutherland & Hamilton		50 00
	A. Johnson		61
	Revelstoke Hospital Society		17 00
	Howson's Undertaking Parlors		194 00
Nov. 3.	A. P. Levesque		43 00

CR.

ESTATE OF SABAD ALLI.

1920.			
Dec. 31.	By Cash	$	858 34

ESTATE OF BENJAMIN F. GAYMAN.

1920.			
Dec. 31.	By Cash	$1,500	00

ESTATE OF REBECCA HARVEY.

1920.			
Dec. 31.	By Cash	$	120 00

ESTATE OF HERBERT HEFFREN.

1920.			
Dec. 31.	By Cash	$	150 00

ESTATE OF HENRY B. KIRK.

1920.			
Dec. 31.	By Cash	$	150 00

ESTATE OF JOHN OLM.

1920.			
Dec. 31.	By Cash	$4,240	86

ESTATE OF ERNEST GUSTAF SEDERBERG.

1920.			
Dec. 31.	By Cash	$	305 50

ESTATE OF SOO LUNG YOU.

1920.			
Dec. 31.	By Cash	$	337 40

ESTATE OF MIKE STANICH.

1920.			
Dec. 31.	By Cash	$	600 00

ESTATE OF JOHN SWEENY.

1920.			
Dec. 31.	By Cash	$	611 92

DR.

ESTATE OF JOSEPH TURCAK.

1920.			
Feb. 23.	To Commission (Administrator)	$	12 19
	O'Shea & Farris		56 03
	Probate duty		12 19

ESTATE OF CHARLES H. M. WILLIAMS.

1920.			
June 16.	To Miss Louise V. Williams	$	830 89

CR.

ESTATE OF JOSEPH TURCAK.

1920.			
Dec. 31.	By Cash	$	243 81

ARTHUR JOHNSON,
Official Administrator.

ROSSLAND ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF LUKA SISICH.

1920.			
Jan. 2.	To Gordon	$	152 00
Mar. 9.	Pincott		107 06
	McNeill		15 50
April 7.	Assessor and Collector		3 97

ESTATE OF WM. R. MELLARD.

1920.			
Mar. 5.	To D. M. Ferry	$	4 50
	J. Mellard		36 50
	A. McDonald & Company		85 95
	J. R. Randall		13 70
	"		21 40
	Swift Canadian Company		19 65
	W. H. Malkin Co.		53 60
	Mabel Mallard		26 30
	R. G. Rutherford		4 50
	Trail Hospital		7 95
	Trail "News"		1 05
	Mrs. G. M. Mellard		930 00
Mar. 8.	Provincial Collector, Nelson		37 75
Mar. 19.	J. H. Schofield		43 89
June 15.	Provincial Collector, Nelson		12 33
	City of Trail		17 42
	R. C. Crowe		134 25
June 21.	McKelvey & Randall		251 63

ESTATE OF MIKE BAROVICH.

1920.			
Mar. 9.	To C. F. R. Pincott	$	77 83
	H. R. Townsend		6 25
	Tyson Bros.		61
	Lauriente & Son		15 42
	C.M. & S. Co. of Can.		3 82
	Dr. Nay		21 07

ESTATE OF K. A. HENNESSY.

1920.			
Mar. 5.	To Assessor and Collector	$	1 70
Sept. 10.	C. F. R. Pincott		54 75
	R. J. Clegg		28 35

ESTATE OF WM. GLENDENNING.

1920.			
Aug. 12.	To Mary E. Glendenning	$	197 34

ESTATE OF CHARLES NYGARD.

1920.			
Aug. 12.	To C. F. R. Pincott	$	7 75
	Carl Nygard		146 20
	Henrika Nygard		146 20

CR.

ESTATE OF LUKA SISICH.

1920.			
Jan. 15.	By Cash	$	400 00

ESTATE OF WM. R. MELLARD.

1920.			
Jan. 28.	By Cash	$	24 00
Jan. 14.	"		489 00
Feb. 6.	"		100 00
Mar. 8.	"		475 00
May 6.	"		775 00
Aug. 11.	"		36 00

ESTATE OF MIKE BAROVICH.

1920.			
Jan. 15.	By Cash	$	125 00

ESTATE OF HENRY WINTERTON.

1920.			
Mar. 15.	By Cash	$	1,304 40
July 2.	"		628 82

ESTATE OF SAMUEL ALLEN.

1920.			
July 8.	By Cash	$	10 00

H. R. TOWNSEND,
Official Administrator.

SIMILKAMEEN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JEREMIAH P. FRAME.

1920.		
May 20.	To J. R. Brown	$ 12 41
	"	31 80
	W. French	75 00
	A. S. Black	48 14
	Deputy Minister of Finance	24 93
Sept. 27.	" "	15 60

ESTATE OF GEORGE BJORKMAN.

1920.		
May 20.	To G. S. Black	$ 56 50
	J. R. Brown	4 80
	Deputy Minister of Finance	15 53
Nov. 16.	Acting Consul-General for Sweden	605 76

CR.

ESTATE OF JEREMIAH P. FRAME.

1920.		
April 26.	By Canadian Bank of Commerce	$ 498 75
Aug. 10.	" "	312 05

ESTATE OF GEORGE BJORKMAN.

1920.		
April 26.	By Bank of Montreal	$ 310 60

JAS. R. BROWN,
Official Administrator.

SKEENA RIVER AND QUEEN CHARLOTTE MINING DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF HARRY MCNEIL.

1920.		
Jan. 19.	To District Registrar	$ 1 00
Oct. 5.	McCaffery, Gibbons & Doyle	40 00

ESTATE OF J. AND R. JOHNSON.

1920.		
Jan. 24.	To Assessor, taxes	$ 1 70

ESTATE OF JOHN HERSTICK.

1920.		
June 12.	To Assessor, taxes	$ 20 12

ESTATE OF JOSEPH YOUNG.

1920.		
Jan. 19.	To Flora Young	$ 111 96

ESTATE OF S. E. STEBBINS.

1920.		
Jan. 2.	To Commission	$ 14 25
Jan. 19.	District Registrar	1 00
June 12.	City of Prince Rupert, taxes	54 87
Sept. 18.	Williams & Manson	173 25

ESTATE OF JAMES DACK.

1920.		
June 12.	To City of Nanaimo, taxes	$ 20 25

ESTATE OF CHARLES MCLELLAN.

1920.		
Feb. 17.	To Mrs. C. Maclean	$ 243 27

ESTATE OF GUST MILLER.

1920.		
Oct. 5.	To Haynor Bros.	$ 49 45

ESTATE OF AMBROSE MORRIS.

1920.		
Jan. 23.	To H. W. Ingraham	$ 3 78

ESTATE OF JOHN POST.

1920.		
Jan. 2.	To Commission	$ 32 00

ESTATE OF JOHN CARLSON.

1920.		
Mar. 4.	To Consul-General for Sweden	$ 658 39

DR.

ESTATE OF CARL RICHARD CARLSON.

1920.			
Mar. 4.	To Consul-General for Sweden..	$	500 00
May 17.	Commission		7 14
June 11.	"Daily News"		11 40
Sept. 2.	North Vancouver, taxes		14 02
June 26.	City of Prince Rupert, taxes		30 20
Aug. 21.	Patmore & Fulton		15 00

ESTATE OF GUESEPPE CORRADO.

1920.			
April 8.	To Amandio Corrado	$1,365	64
June 11.	Haynor Bros.		97 00

ESTATE OF ARNI HANNESSON.

1920.			
Feb. 17.	To Vice-Consul for Denmark...	$	392 98

ESTATE OF TOMO MUNIZABE.

1920.			
Feb. 27.	To Vida Munizabe	$	318 59

ESTATE OF JOHN MORRISON.

1920.			
Jan. 23.	To District Registrar	$	1 00
Feb. 2.	Commission		6 76
July 30.	N. Morrison		253 60

ESTATE OF O. MAGNUSSON.

1920.			
Jan. 19.	To Consul-General for Sweden..	$	88 40

ESTATE OF JOE RIZATTO.

1920.			
Feb. 5.	To Consul-General for Italy...	$3,087	79

ESTATE OF JOHN BUNTING.

1920.			
Jan. 24.	To Assessor, taxes	$	27 13
June 12.	City of Prince Rupert, taxes		18 04
Oct. 8.	Government Agent, Prince Rupert		255 80
Oct. 13.	William Bunting		211 23
	George Bunting		61 23
	M. J. Bunting		61 23
	Joshua Bunting		61 23
	M. A. Bunting		61 23
	Mrs. E. Scotson		61 23

ESTATE OF ERNEST PFALBUSCH.

1920.			
Sept. 21.	To A. R. Mallory	$	142 50
June 11.	Mrs. P. Frey		10 00

ESTATE OF D. J. RAINEY.

1920.			
May 17.	To Free Miner's certificate	$	5 00
	Commission		27 50
June 11.	District Registrar		1 00
Dec. 29.	Patmore & Fulton		92 00

ESTATE OF J. B. BARNAICHEZ.

1920.			
Dec. 4.	To Patmore & Fulton	$	7 50

ESTATE OF HERMAN MCKINNON.

1920.			
Jan. 19.	To Mrs. Perry	$	90 40
	Mrs. Smith		90 40
	Jessie McKinnon		90 40
	Augustus McKinnon		90 39
	Randall McKinnon		90 39
	Arthur McKinnon		90 39
	Clifford McKinnon		90 40

ESTATE OF ROBERT A. GRANT.

1920.			
Mar. 3.	To Exchange	$	1 95
Jan. 2.	Commission		8 55
Jan. 19.	Receiver-General, income-tax		46 00
May 17.	Commission		38 94
June 11.	Joseph Naylor, balance of note		617 87
Nov. 9.	Commission		28 75

ESTATE OF WILLIAM SAMMON.

1920.			
Jan. 24.	To Taxes, Lot 3486, R. 5	$	5 49
May 17.	Free Miner's certificate		5 00
Aug. 14.	D. J. McDonald, assessment-work Heather Bloom Mineral Claim		102 50

CR.

ESTATE OF CARL RICHARD CARLSON.

1920.			
May 5.	By Dybhavn & Hanson.....	$	142 97
Dec. 22.	„ „		340 00
	„ „		171 37

ESTATE OF JOHN MORRISON.

1920.			
Feb. 2.	By Sale of Lot 27, Bk. 23, Sec. 8, Prince Rupert	$	135 35

ESTATE OF ERNEST PFALBUSCH.

1920.			
July 14.	By A. R. Mallory, rent	$	36 00
	J. McDougal		200 09

ESTATE OF D. J. RAINEY.

1920.			
Feb. 9.	By Salmon Bear River Mines, dividend	$	550 00

ESTATE OF ROBERT A. GRANT.

1920.			
Mar. 3.	By D. Comeau, mortgage	$	778 80
May 27.	Prince Rupert Club debentures		8 00
June 17.	Deep C. Fisheries		164 00
Oct. 26.	B. O. Oughton, Humble mortgage		575 00

DR.

ESTATE OF CONSTANTINO ANTINUO.

1920.			
Sept. 28.	To B.C. Undertakers	$	28 50

ESTATE OF PIETRO GIVOTTE.

1920.			
May 28.	To Italian Consul-General	$	484 56
July 19.	" "		32 68

ESTATE OF WILLIAM SUNBERG.

1920.			
Jan. 20.	To Assessor, taxes	$	17 01
	A. Heymann		10 00
Feb. 2.	Commission		2 50
Sept. 25.	Consul-General for Sweden		1,155 94

ESTATE OF STANLEY WOZNEY.

1920.			
Feb. 2.	To Commission	$	7 59

ESTATE OF D. McKAY.

1920.			
Oct. 8.	To Prince Rupert Hospital	$	10 00
	Haynor Bros.		100 00

ESTATE OF SAM FAGERLAND.

1920.			
Feb. 2.	To Commission	$	4 05
June 12.	North Vancouver, taxes		4 52

ESTATE OF ALEX. J. DONOHUE.

1920.			
Feb. 27.	To Assessor, Quesnel	$	16 62
May 17.	Patmore & Fulton		5 00
	Commission		38 53
	Mrs. Donohue		850 00
	Assessor, Quesnel		2 76
June 11.	District Registrar		1 00
Sept. 24.	Patmore & Fulton		20 50
	Mrs. Donohue		3 66

ESTATE OF PAUL OSA.

1920.			
July 5.	To Marcus Osa	$	118 76
	Margarita Osa		118 76

ESTATE OF H. MPOUTSAS.

1920.			
Oct. 5.	To Haynor Bros.	$	150 00

ESTATE OF STANLEY BARTLETT.

1920.			
Jan. 19.	To Laura Cousley	$	221 09

ESTATE OF JOHN DARLING.

1920.			
May 17.	To Commission	$	10 70
	Patmore & Fulton		5 00
	Elizabeth Darling		101 73
	Lucy C. Carver		101 72
	Thomas Darling		101 72
	Flora McBrien		101 72
	Mrs. Sullivan		25 43
	Bessie E. Ward		25 43
	J. T. Neazor		25 43
	George Neazor		25 43

ESTATE OF WM. McK. LOGAN.

1920.			
May 17.	To Commission	$	97 37
June 11.	District Registrar		1 00
Dec. 29.	Patmore & Fulton		151 39

ESTATE OF GUSTAVE GEORGE.

1920.			
Jan. 9, 23, Feb. 27.	To Exchange on cheques	$	0 74
Jan. 2.	Commission		1 73
Jan. 19.	District Registrar		1 00
Jan. 23.	Assessor, taxes, Stewart		3 42
Feb. 2.	Commission		9 50
Feb. 5.	Patmore & Fulton		5 00
Feb. 17.	Madame Clement		300 00
May 17.	Commission		1 00

ESTATE OF TONY LUCICH.

1920.			
Oct. 5.	To Haynor Bros.	$	200 00

ESTATE OF JOSEPH BROWN.

1920.			
Feb. 2.	To Commission	$	9 30
Feb. 17, 27.	Patmore & Fulton		29 95
Mar. 31.	News Printing & Publishing Co.		8 50

CR.

ESTATE OF PIETRO GIVOTTE.

1920.			
Sept. 7.	By Refund of probate	$	32 68

ESTATE OF WILLIAM SUNBERG.

1920.			
Jan. 9.	By Sale of hay	$	50 00
July 16.	W. S. Gibbs, payment on S.E. ¼ Sec. 27, Tp. 8, R. 4		640 00

ESTATE OF STANLEY WOZNEY.

1920.			
Jan. 26.	By Gamula, note	$	151 85

ESTATE OF SAM FAGERLAND.

1920.			
Jan. 28.	By Share of salvage, "Commodore"	$	81 00

ESTATE OF ALEX. J. DONOHUE.

1920.			
Feb. 21.	By Bashaw Lumber Co.	$	770 70

ESTATE OF JOHN DARLING.

1920.			
April 17.	By Payment, Lot 7, Bk. 29, Sec. 6, Prince Rupert	$	214 00

ESTATE OF WM. McK. LOGAN.

1920.			
Feb. 9.	By Salmon Bear River Mining Co.	$1,947	50

ESTATE OF GUSTAVE GEORGE.

1920.			
Jan. 9, 23, Feb. 27.	By Mrs. Duff, payment, Dyder Lot	$	60 00
Jan. 23.	Wm. Fraser, sale of Lots 3 and 4, Bk. 2, Stewart		150 00
June 24.	P. LaFrance		30 50

ESTATE OF JOSEPH BROWN.

1920.			
Jan. 8.	By L. Handenschild	$	186 00

DR.

ESTATE OF TONY RADOVICH.

1920.			
Jan. 2.	To Commission	$ 19	26
Jan. 23.	Williams & Manson	34	05
Feb. 5.	"Daily News"	8	50
Feb. 27.	Granby Co., funeral	45	20
Mar. 30.	Farris & Emmerson	4	50
	Stana Rebarich	273	74

ESTATE OF C. W. SHAIRLIN.

1920.			
Jan. 2.	To Commission	$ 40	00
Jan. 19.	District Registrar	1	00
	Assessor	108	31
	Patmore & Fulton	65	95
Jan. 24.	S. C. Weeks	216	00
Feb. 5.	"Daily News"	8	50
Nov. 9.	Commission	23	75

ESTATE OF G. JOHANNSSON.

1920.			
Feb. 5.	To Assessor, taxes	$ 3	82

ESTATE OF CHARLES SWANSON.

1920.			
Jan. 2.	To Commission	$ 34	16
Jan. 19.	District Registrar	1	00
May 17.	Free miner's certificate	5	00
Aug. 12.	Patmore & Fulton	51	50
Oct. 8.	Commission	96	15
Oct. 22.	Consul-General for Sweden	1,800	00
	F. A. Swanson	1,800	00
Nov. 9.	Commission	132	69
Dec. 7.	Consul-General for Sweden	1,120	00
	F. A. Swanson	1,120	00
Dec. 28.	Patmore & Fulton	20	00

ESTATE OF GEORGE FEELIS (OR LELEDAKIS).

July 13.	To Granby Co., funeral	$ 48	15

ESTATE OF EDWARD M. HAYNES.

1920.			
Jan. 2.	To Commission	$ 18	60
Jan. 19.	F. Haynes	70	68
	Mrs. Magee	35	34
	Ruth A. Haynes	35	34
	L. J. Barnard	23	56
	Mrs. E. Andrews	23	56
	G. Haynes	23	56
	A. L. Haynes	70	68
Aug. 12.	News Printing & Publishing Co.	8	50
Dec. 11.	Patmore & Fulton	7	50

ESTATE OF LEWIS DIXON.

1920.			
Aug. 12.	To Patmore & Fulton	$ 90	60
	News Printing & Publishing Co.	8	50
Oct. 16.	Probate	30	00
	Commission	31	14
	L. Dixon	85	02
	D. Dixon	85	02
	Mrs. Phelan	85	02
	Geo. Dixon	42	51
	H. Dixon	42	51
	L. McCord	42	51
	H. Burril	42	51

ESTATE OF ERNEST CARLSON.

1920.			
Jan. 2.	To Commission	$ 180	00
April 12.	Probate and succession duty	1,689	39
	Free miner's certificate	5	00
	Consul-General for Sweden	2,950	00
	V. O. Carlson	2,950	00
	A. E. V. Carlson	2,950	00

ESTATE OF GUSTAF ALVIN JOHNSON.

1920.			
Jan. 19.	To District Registrar	$ 2	00
Feb. 2.	Commission	25	93

ESTATE OF NATALIE CONDO.

1920.			
Feb. 17, July 5.	Giovanna Condo	$1,135	70

CR.

ESTATE OF C. W. SHAIRLIN.

1920.			
Oct. 2.	By L. H. Kenny	$ 475	00

ESTATE OF CHARLES SWANSON.

1920.			
May 1.	By J. D. Meenach, third payment, Bonanza Fraction Mineral Claim	$1,923	08
Oct. 29.	Fourth payment, Bonanza Fraction Mineral Claim	2,653	80
Dec. 24.	Silver Cliff Mines, Ltd.	2,666	67

ESTATE OF EDWARD M. HAYNES.

1920.			
Dec. 10.	By First payment, Lot 1430	$ 900	00

ESTATE OF LEWIS DIXON.

1920.			
July 10.	By Bank of Commerce	$ 622	87

ESTATE OF GUSTAF ALVIN JOHNSON.

1920.			
Jan. 27.	By Sale of Victory bond	$ 505	00
Feb. 27.	Interest	13	75

DR.

ESTATE OF ADELAIDE E. KILBURN.

1920.			
Jan. 19.	To G. W. Coyle	$	583 10

ESTATE OF HERMAN ANDERSON.

1920.			
Aug. 12.	To News Printing & Publishing Co.	$	8 50
	Patmore & Fulton		34 95
Oct. 5.	Granby Co., funeral		86 50
	H. Anderson		397 95

ESTATE OF ROBERT J. DUNN.

1920.			
Jan. 19.	To District Registrar	$	3 00
April 13.	John Dunn		800 00
May 17.	James Hagan		177 75

ESTATE OF ALFRED KYTE.

1920.			
Jan. 19.	To District Registrar	$	1 00
Jan. 23.	Probate		29 65
Feb. 2.	Commission		25 00
Feb. 5.	McCaffery & Gibbons		97 00
Feb. 17.	Williams & Manson		118 62
April 8.	C. C. Coleman		191 93
	C. B. Coleman		500 00
	McGivern, Haydon & Ebbs		40 00

ESTATE OF ELI KNUTSON.

1920.			
Jan. 2.	To Commission	$	12 87
Jan. 19.	J. K. Gordon		14 65
Jan. 23.	Assessor, taxes, Lot 1429		4 32
June 11.	Assessor, taxes, Lot 5, Bk. 10, Terrace		3 37
July 17.	William Little		30 00
	H. A. Swain		6 00
	T. J. Marsh		6 00
Dec. 4.	Commission		12 10
Dec. 18.	Collector		2 21
Dec. 16.	H. L. Frank		5 00

ESTATE OF AARON NELSON.

1920.			
Jan. 19.	To District Registrar	$	1 00
May 17.	Commission		42 50
Sept. 25.	S. B. Peacock		100 00

ESTATE OF HENRY ROBERTS.

1920.			
Jan. 2.	To Commission	$	10 65

ESTATE OF PETER BROWN.

1920.			
Jan. 2.	To Commission	$	5 00

ESTATE OF NEIL MCEACHERN.

1920.			
Jan. 2.	To Commission	$	1 45

ESTATE OF F. R. GIERTSEN.

1920.			
June 12.	To Patmore & Fulton	$	19 80
July 30.	"		38 95
Aug. 21.	Probate and succession duty		224 95
	News Printing & Publishing Co.		6 00

ESTATE OF H. MCP. MARTIN.

1920.			
Jan. 2.	To Commission	$	1 83
Jan. 19.	J. Dorgan		15 00
May 17.	Commission		9 26
	Free miner's certificate		5 00
June 11.	Williams & Manson		91 85
	"Daily News"		18 00
	G. J. Jacobs		54 00
Oct. 5.	A. Shields		65 00
	Commission		2 28
Nov. 9.	Succession duty		428 77
Dec. 11.	"Daily News"		8 50

CR.

ESTATE OF HERMAN ANDERSON.

1920.			
Feb. 21.	By Granby Co., wages	$	169 30

ESTATE OF ROBERT J. DUNN.

1920.			
May 8.	By Patmore & Fulton	$	1,150 58

ESTATE OF ALFRED KYTE.

1920.			
Jan. 28.	By Payment on sale of interest in Canadian Laundry	$	500 00

ESTATE OF ELI KNUTSON.

1920.			
Nov. 18.	By Knute Olsen	$	242 00
Dec. 7.	C. Larson		50 00

ESTATE OF AARON NELSON.

1920.			
Mar. 26.	By S. B. Peacock	$	850 00

ESTATE OF F. R. GIERTSEN.

1920.			
May 21.	By D. H. Hays	$	330 00

ESTATE OF H. MCP. MARTIN.

1920.			
April 17.	By Cash	$	2 00
	Williams & Manson		33 63
	R. K. Neil		148 40
	C. W. Homer		1 22
July 16.	J. Dorgan		45 60
Oct. 2.	Williams & Manson		428 77
Nov. 12.	Royal Bank		3 34

DR.

ESTATE OF WILLIAM SELIG.

1920.			
Feb. 2.	To Commission	$ 184	68
Feb. 3.	News Printing & Publishing Co.	14	20
	Rupert Marine Iron Co.	22	50
	N. M. McLean	202	42
	Belknap-Wright L. Co.	40	61
	Prince Rupert General Hospital	8	00
	Akerberg, Thomson & Co.	487	20
	District Registrar	400	44
	Thomas A. Roy	32	60
	B.C. Undertakers	300	00
	J. Hunter	157	15
	Greer & Beatty	14	00
	Fred Stork	17	60
	C. O. Rowe	11	00
Feb. 5.	Pacific Cartage	1	50
Feb. 17.	Clarence Selig	15	00
Feb. 19.	Albert & McCaffery	42	30
Mar. 2.	Akerberg, Thomson & Co.	219	60
Mar. 4.	Smith & Mallett	10	00
	H. Letourneau	12	50
Mar. 30.	Williams & Manson	63	35
	Dr. W. T. Kergin	17	50
	Kaien Hardware Co.	53	05
Mar. 31.	Empire Publishing Co.	21	00
May 17.	Deputy Minister of Finance, commission	5	00
	Akerberg, Thomson & Co.	54	81
June 12.	H. D. Selig	15	00
	Parkin & Ward	4	25

ESTATE OF JOHN KENT.

1920.			
Mar. 23.	To Probate	$ 1	72
	Law-stamps	2	00
	B.C. Undertakers, funeral	75	00
May 17.	Deputy Minister of Finance, commission	16	14
	Prince Rupert General Hospital	15	00
June 11.	Certified copy of letters of administration	1	00
July 30.	Pacific Cartage	1	47
Dec. 21.	I. Kent	210	52

ESTATE OF JOHN CURRIE.

1920.			
July 30.	To B.C. Undertakers, funeral	$ 28	45
May 17.	Deputy Minister of Finance, commission	2	32
July 30.	B.C. Undertakers	44	23

ESTATE OF WILLIAM STRATFORD.

1920.			
Nov. 16.	To Probate	$ 0	50
	News Printing & Publishing Co.	8	50
	Patmore & Fulton	36	00

ESTATE OF E. P. GINGRAS.

1920.			
July 5.	To A. B. Evans	$ 2	00
	Freight on goods to Ottawa	31	05
July 30.	Kaien Hardware Co.		70
	Pacific Cartage Co.	1	50
Aug. 12.	W. G. Barrie	2	50
Aug. 21.	Provincial Collector, income-tax	9	91
Oct. 8.	Deputy Minister of Finance, commission	40	27
Oct. 29.	G. D. Tite	138	55
	C. H. Orme	150	00
	Cow Bay Tank & Sheet Metal Co.	8	25
	Parkin & Ward	43	20
	F. Scadden	23	00
	Prince Rupert Club	9	50
	P. Laporte	10	85
Nov. 9.	News Printing & Publishing Co.	34	50
Nov. 16.	News Printing & Publishing Co.	8	50
	Patmore & Fulton	82	85
	Probate	16	55

ESTATE OF L. KRESSER.

1920.			
Aug. 14.	To R. Larson, funeral	$ 100	00
Oct. 8	Deputy Minister of Finance, commission	12	07

CR.

ESTATE OF WILLIAM SELIG.

1920.			
Jan. 23.	By Cash	$ 159	30
Jan. 24.	Exchange	4	40
Jan. 28.	Sale of "Vital Spark"	3,530	00
April 3.	G. Starratt, sale of nets at Stewart Lake	100	00

ESTATE OF JOHN KENT.

1920.			
Mar. 23.	By Cash	$ 7	75
	Whalen Pulp & Paper Mills, wages, October, 1919	169	95
	Whalen Pulp & Paper Mills, wages, November, 1919	95	15
April 17.	Sale of tools	50	00

ESTATE OF JOHN CURRIE.

1920.			
April 17.	By Cash	$ 16	55
	Sale of rowboat	30	00
July 15.	Mrs. Sproul	28	45

ESTATE OF WILLIAM STRATFORD.

1920.			
May 8.	By Cheque found in effects	$ 50	00
Aug. 24.	W. Moberley	40	00

ESTATE OF E. P. GINGRAS.

1920.			
June 24.	By Auction of furniture	$ 805	55

ESTATE OF L. KRESSER.

1920.			
June 26.	By Cash	$ 40	00
July 5.	Cash on body	201	50

DR.

ESTATE OF ROBERT H. ROBERTSON.

1920.			
May 21.	To Free miner's certificate, 1920–21	$	5 00
Nov. 5.	Law-stamps		2 00
Nov. 9.	Deputy Minister of Finance, commission		10 42
Nov. 17.	Dr. W. T. Kergin		80 00
	R. H. Robertson		111 13

ESTATE OF C. W. HESS.

1920.			
Aug. 12.	To Seal Cove Marine Ways	$	10 00
	Dr. N. M. McNeill		25 00
	News Printing & Publishing Co.		8 50
	Patmore & Fulton		44 95
Aug. 14.	" "		5 00
Aug. 21.	F. Prescott		10 00
	Cow Bay Tank and Steel Metal Works		25 50
	Parkin Ward Electric Co.		26 40
	Akerberg, Thomson & Co.		124 45
	Howe & McNulty		7 50
	C. H. Thomas		13 45
Oct. 8.	Deputy Minister of Finance, commission		85 83
Oct. 19.	Probate and succession duty		307 58

ESTATE OF JOHN B. DODSON.

1920.			
Aug. 12.	To News Printing & Publishing Co.	$	8 50
	Patmore & Fulton		78 40
Oct. 8.	Deputy Minister of Finance, commission		14 56

ESTATE OF ABEL EDWARDS.

1920.			
July 19.	To J. L. Barge, amount over-remitted	$	32 00
Aug. 21.	Akerberg, Thomson & Co.		104 55
	Howe & McNulty		18 65
Sept. 25.	G. Levick		25 25
Oct. 8.	Deputy Minister of Finance, commission		11 70

ESTATE OF MICHAEL O'MALLY.

1920.			
Nov. 5.	To Law-stamps	$	2 00
Nov. 9.	Deputy Minister of Finance, commission		9 77
	Probate		4 72
Dec. 11.	J. L. Barge, funeral		101 00

ESTATE OF R. O. FULLBROOK.

1920.			
Sept. 18.	To Miss Lainy, funeral	$	10 00
Nov. 16.	Patmore & Fulton		51 05
	News Printing & Publishing Co.		8 50
Dec. 4.	Minister of Finance		173 07
	Probate and succession duty		330 29

ESTATE OF JOHN P. REDDING.

1920.			
Nov. 9.	To Deputy Minister of Finance, commission	$	4 00

ESTATE OF MANUEL MIRANDA.

1920.			
Nov. 9.	To Deputy Minister of Finance, commission	$	77 59
	Patmore & Fulton		44 95
	Probate		14 89
Nov. 11.	News Printing & Publishing Co.		8 50
Dec. 4.	Minister of Finance, commission		2 48
Dec. 7.	Granby Co., funeral		111 75
	Manuel Miranda		1,339 92
	Registrar, Births, Deaths, and Marriages		1 50

CR.

ESTATE OF ROBERT H. ROBERTSON.

1920.			
May 18.	By Cash	$	68 55
Oct. 28.	Bank of Commerce		140 00

ESTATE OF C. W. HESS.

1920.			
July 9.	By Payment on boat "Nadu"	$1,000	00
	Royal Bank		516 69
Aug. 5.	Balance on boat "Nadu"		200 00

ESTATE OF JOHN B. DODSON.

1920.			
July 10.	By Bank of Montreal	$	291 28

ESTATE OF HORACE ROCHFORT.

1920.			
July 14.	By Sale of clothing	$	20 00

ESTATE OF ABEL EDWARDS.

1920.			
July 15.	By J. L. Barge, sale of boat "McDuff"	$	266 00

ESTATE OF MICHAEL O'MALLY.

1920.			
Aug. 11.	By Cash	$	5 00
Oct. 27.	Whalen Pulp & Paper Mills, wages		102 40
	Whalen Pulp & Paper Mills, wages		88 16

ESTATE OF MAH WING.

1920.			
Aug. 24.	By Wages, Lowe Inlet Cannery	$	136 00

ESTATE OF J. CHAPMAN.

1920.			
Sept. 8.	By Cash	$	10 75

ESTATE OF R. O. FULLBROOK.

1920.			
Aug. 24.	By Cash	$	4 95
Sept. 7.	Mrs. R. W. Large		185 70
Nov. 18.	Bank of Commerce		3,270 79

ESTATE OF JOHN P. REDDING.

1920.			
Aug. 24.	By Cash	$	29 80
Sept. 21.	Bank of Montreal		5 00
Oct. 27.	Surf Inlet Mines, wages		46 18

ESTATE OF MANUEL MIRANDA.

1920.			
Aug. 24.	By Cash	$	1 00
Oct. 27.	Bank of Commerce		819 62
	Royal Bank		731 36
Nov. 30.	Granby Co., wages		49 60

DR.

ESTATE OF EVAN K. OLSEN.

1920.			
Sept. 18.	To Pacific Cartage	$	3 85
Nov. 9.	Deputy Minister of Finance, commission		59 28
	Patmore & Fulton		44 95
Nov. 16.	News Printing & Publishing Co.		8 50
	Probate		11 95
	A. Bedore		750 00
Dec. 16.	W. E. Smith		15 00
	Kitsumgallum Cemetery		6 00
	H. L. Frank, grave		5 00
	Wm. Little, coffin		30 00

ESTATE OF A. DAGOSTINI.

1920.			
Aug. 31.	To G. B. Laurence, casket	$	30 00
Oct. 5.	Aldred & Carruthers		20 00
	Can. N.E. Rly.		5 00

ESTATE OF LOUNG DUCK.

1920.			
Sept. 8.	To B.C. Undertakers	$	175 00
Oct. 5.	Fisher & Oughton		52 05
	Probate		30 28
Oct. 8.	Deputy Minister of Finance, commission		39 03
Oct. 22.	Official Administrator, refund of amount drawn from Can. Bank of Commerce		480 73

ESTATE OF J. SEPLA (SEPPLA).

1920.			
Oct. 28.	To B.C. Undertakers	$	125 00
Nov. 9.	Deputy Minister of Finance, commission		45 83
	Patmore & Fulton		39 95
	Probate		7 84
Nov. 11.	News Printing & Publishing Co.		8 50
Nov. 23.	Farris & Emmerson		55 85
Dec. 4.	Deputy Minister of Finance, commission		112 71

ESTATE OF JOHN SMART.

1920.			
Sept. 30.	To B.C. Undertakers	$	64 15

ESTATE OF M. ZADOBIWISKE.

1920.			
Oct. 28.	To B.C. Undertakers	$	150 00
Nov. 9.	Deputy Minister of Finance, commission		23 02
	Patmore & Fulton		29 95
	Probate		2 85
Nov. 11.	News Printing & Publishing Co.		8 50

ESTATE OF JOHN ELLWOOD.

1920.			
Nov. 27.	To Granby Company, funeral	$	144 60
	Government Telegraph, cable		12 20
Dec. 4.	Registrar, Births, Deaths, and Marriages		75
	Minister of Finance		55 02
	Mrs. Ellwood		75 75

ESTATE OF RODERICK FRASER.

1920.			
Dec. 4.	To Minister of Finance	$	0 91

ESTATE OF DONALD FRASER.

1920.			
Dec. 21.	To B.C. Undertakers	$	175 00

ESTATE OF DAVID HANLEY.

1920.			
Dec. 2.	To B.C. Undertakers	$	280 00
Dec. 10.	Mrs. M. Kelly		166 35

CR.

ESTATE OF EVAN K. OLSEN.

1920.			
Aug. 27.	By Cash	$	38 60
Sept. 15.	Sale of trunk		20 00
Oct. 28.	Bank of Montreal		1,118 00
	Interest		8 36

ESTATE OF A. DAGOSTINI.

1920.			
Aug. 31.	By G. Seiffert, balance wages	$	166 10

ESTATE OF LOUNG DUCK.

1920.			
Sept. 7.	By Cash	$	300 00
Sept. 24.	Bank of Commerce		480 73

ESTATE OF J. SEPLA (SEPPLA).

1920.			
Sept. 21.	By Cash	$	42 75
Oct. 27.	Surf Inlet Mines, cheques		667 15
	Bank of Montreal		206 80
Nov. 30.	Workers' Credit Union		2,001 58
	Premium on U.S. cheque		252 68

ESTATE OF JOHN SMART.

1920.			
Sept. 24.	By Bank of Montreal, P.R.	$	64 15

ESTATE OF M. ZADOBIWISKE.

1920.			
Oct. 27.	By Surf Inlet Mines, cheques	$	460 49

ESTATE OF JOHN ELLWOOD.

1920.			
Oct. 27.	By Cash	$	5 35
Nov. 23.	Granby Company, wages		75 75
	Bank of Commerce		1,095 14

ESTATE OF RODERICK FRASER.

1920.			
Nov. 12.	By Sale of suit-case	$	7 50
Nov. 18.	Balance of wages, Granby		10 75

ESTATE OF JOHN MELVIN.

1920.			
Nov. 29.	By Cash	$	6 00
Dec. 30.	Whalen Pulp & Paper Mills		18 20

ESTATE OF DONALD FRASER.

1920.			
Dec. 3.	By Cash	$	5 25
	Bank of Toronto		1,335 60
Dec. 21.	Whalen Pulp & Paper Mills		5 14
	" "		108 34

ESTATE OF DAVID HANLEY.

1920.			
Dec. 2.	By Bank of Montreal	$	625 00

ESTATE OF JAMES MATHESON.

1920.			
Dec. 20.	By W. J. Leary, sale of effects	$	76 59

Dr.		Cr.		
		ESTATE OF GEORGE NEWMAN.		
		1920. Dec. 20. By Cash		$ 5 60
		ESTATE OF K. KOBAYASHI.		
		1920. Dec. 30. By Bank of Montreal		$1,105 35
		ESTATE OF ANDREW OLSON.		
		1920. Dec. 30. By Cash		$ 33 35

J. H. McMULLIN,
Official Administrator.

SOUTH OKANAGAN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
	ESTATE OF TEIJI SATO.			ESTATE OF TEIJI SATO.	
1920. Oct. 18.	To R. H. English	$ 25 00	1920. Jan. 9.	By Coupons of bonds	$ 11 00
	W. C. Kelley	13 19			
	ESTATE OF GEORGE RABY.			ESTATE OF GEORGE RABY.	
1920. Jan. 9.	To S. Supply Co., Ltd.	$ 140 00	1920. Jan. 9.	By Cheque, W. G. Raby Estate	$ 45 00
	Dr. F. W. Andrew	3 50	Oct. 1.	„ „ „	1,522 50
	Review Publishing Co.	2 76			
Oct. 18.	W. C. Kelley	84 84			
	H. E. Raby	400 00			
	Ada Emma Craig	400 00			
	Catharine M. Harvey	400 00			
	ESTATE OF WM. GEORGE RABY.			ESTATE OF WM. GEORGE RABY.	
1920. Jan. 9.	To Summerland Supply Co., Ltd.	$ 73 60	1920. Jan. 8.	By Cheque, Canada N. Fire Ins. Co.	$ 60 00
	Horace Trowsse	145 60	Jan. 16.	Cash, T. E. Bushell	10 00
	T. H. Riley	5 00	Aug. 23.	Cheque, Soldier Settlement Board	6,500 00
	Geo. Raby Estate	45 00			
	Review Publishing Co., Ltd.	2 88			
	W. Carter	27 28			
Sept. 11.	E. F. Sanborn	28 92			
	G. R. Hookham & Co.	6 00			
	Wm. Ritchie	11 85			
	R. H. English	25 00			
	Summerland Drug Co.	8 55			
	Wm. Atkinson	8 70			
	F. G. Anderson	5 00			
	Land Settlement Board	931 20			
	W. C. Kelley	341 20			
	W. C. Kelley, for G. Raby Estate	1,522 50			
	United Grain-growers' Securities Co., Ltd.	30 00			
1920.	ESTATE OF ALBERT PARLEE.		1920.	ESTATE OF ALBERT PARLEE.	
Sept. 11.	To W. C. Kelley	$ 23 85	Mar. 5.	By Cash, Municipality of Summerland	$ 467 02
Oct. 18.	Registrar S.C.	24 70			

W. C. KELLEY,
Official Administrator.

COUNTY OF VANCOUVER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
	ESTATE OF JOHN ALLEN.			ESTATE OF JOHN ALLEN.	
1920. Jan. 6.	To Northmore, Hale & Davy	$ 33 45	1920. April 17.	By Land in Australia	$ 394 00
May 3.	John Allen	750 84			
	Commission	19 70			

DR.

ESTATE OF ISRAEL ATWELL.

1920.			
April 13.	To Commission	$	5 00
	Probate duty		8 53
	Sundries		3 20
	Mary Atwell		486 98

ESTATE OF EDWIN ANDERSON.

1920.			
Feb. 11.	To D. Donaghy	$	42 85
	Dr. R. C. Boyle		156 00
	Dr. J. A. McAlpine		60 35

ESTATE OF LEONARD ALDIS.

1920.			
Jan. 2.	To J. Oliver	$	24 85
	Nunn, Thomson & Co.		100 00
	"The World"		10 35
	Dr. C. H. Vrooman		30 00
	Commission		13 40
	Sundries		1 50

ESTATE OF ROBERT AITKEN.

1920.			
May 3.	To Wilson & Jamieson	$	29 00
	Jessie J. Mullen		106 60
	Dr. D. A. Dunbar		25 00
	Nunn, Thomson & Clegg		109 00
	Shipping dogs		25 54
	Shipping effects		26 03
	"The World"		9 90
	Wm. Hughes		25 00
	Taxes, Lot 18 of Lots 2, 3, 4, Bk. 20-6-4		24 94
	Dyking taxes		38 75
	Commission		38 73
	Sundries		2 00

ESTATE OF D. ANDERSON.

1920.			
July 5.	To Commission	$	4 70
	T. J. Kearney & Co.		85 00
	Sundries		85

ESTATE OF ELIZABETH ANDERSON.

1920.			
Dec. 2.	To "Daily Sun"	$	6 00
	Joshua Prentice		5 28
	Commission		28 32
	Sundries		1 35

ESTATE OF JOHN AMOS.

1920.			
July 21.	To Thomas W. Jeffs	$	2 00
	Nunn & Thomson		14 00

ESTATE OF CONTESOTTO ANGELO.

1920.			
Dec. 2.	To McTaggart & Ellis	$	40 00
	"Daily Sun"		22 40
	Commission		61 55
	Sundries		1 75
	Donald MacDonald		13 00

ESTATE OF JAMES BROWN.

1920.			
Dec. 31.	To Water rates	$	4 20
	Taxes		479 87
	Succession duty and interest		193 86
	Commission		33 55
	Sundries		2 70

ESTATE OF JULIA H. BELL.

1920.			
Dec. 31.	To Armstrong & Hotson	$	50 00
	Probate duty		18 42
	Harris, Bull & Mason		37 75
	R. B. Ellis		4 50

ESTATE OF GARDOSIO BARDATTI

1920.			
April 14.	To Royal Italian Consul		$2,140 94

ESTATE OF PETER BRESSER.

1920.			
April 14.	To Taxes, Lots 21, 22–29, 30, Bk. 25, D.L. 13	$	48 24

CR.

ESTATE OF ISRAEL ATWELL.

1920.			
May 3.	By War Savings certificate	$	100 07

ESTATE OF E. ARRONSON.

1920.			
Nov. 4.	By Cash	$	5 75
	Effects		2 00

ESTATE OF LEONARD ALDIS.

1920.			
Jan. 2.	By Cash	$	52 14
	Bank of Montreal		215 85
	Watch		1 25

ESTATE OF ROBERT AITKEN.

1920.			
Mar. 20.	By Tools	$	3 00
	Union Bank		219 61
	Bonds		302 00

ESTATE OF D. ANDERSON.

1920.			
May 14.	By Effects	$	5 00
	Cash		89 47

ESTATE OF ELIZABETH ANDERSON.

1920.			
Nov. 11.	By Half Lots 15, 16, 17, Bk. 2, D.L. 725	$	476 30

ESTATE OF JOHN AMOS.

1920.			
July 21.	By Cheque	$	16 47

ESTATE OF CONTESOTTO ANGELO.

1920.			
Nov. 20.	By Bank of Montreal		$1,230 95

ESTATE OF JAMES BROWN.

1920.			
Dec. 31.	By House-rent	$	48 00
	Lots 6, 7, Bk. 287, D.L. 526		500 00
	Insurance and taxes refund.		57 36

ESTATE OF JULIA H. BELL.

1920.			
Dec. 31.	By Remittance to Treasury Department	$	90 00

DR.

ESTATE OF ELIZABETH BRADBURY.

1920.			
Jan. 2.	To Thomas Caravan	$	50 00
	Commission		58 65
	A. E. Field		19 05
	Bird, MacDonald & Co.		100 00
	Thomas A. Caravan		62 25
	Dorcas Caravan		37 20
	Alfred Earle		68 07
	Bird, MacDonald & Co.		135 40
Mar. 25.	The S. Bowell Co.		109 00
May 3.	James Burry		78 96
	D. Cameron		184 20
	A. Earle		84 20
	F. Mercer		184 20

ESTATE OF A. M. BULLOCK.

1920.			
Nov. 18.	To Center & Hanna	$	100 00
	Safety-box rent		9 00

ESTATE OF CYRIL BOSNIT.

1920.			
Feb. 2.	To C. Bossnyt	$	148 21

ESTATE OF FRED H. BATTS.

1921.			
Aug. 26.	To Yellowstone Granite Co.	$	175 00

ESTATE OF DAVID BENNET.

1920.			
Feb. 20.	To Scrimgeour & Hogg	$	49 85
	M. L. Bennet		102 17
	Commission		20 00

ESTATE OF JOHN BECK.

1920.			
April 28.	To J. Oliver	$	15 50
	"Daily Sun"		7 50
	Harron Bros.		82 00
	Commission		6 60
	Sundries		1 85

ESTATE OF MABEL BERG.

1920.			
June 30.	To E. Enell	$	16 00
	Mount Pleasant Undertakers		25 00

ESTATE OF WILFRED J. BROUILETTE.

1920.			
Sept. 30.	To Probate duty	$	41 43
	Commission		172 47
	Lawrence Lefebvre		3,000 00
	"Daily Sun"		25 00
	Wilson, Wheeler & Symes		159 78
	Commission		38 00
	Sundries		3 75

ESTATE OF AUGUSTUS BELL.

1920.			
Sept. 23.	To Funeral	$	109 50
	Congdon, Campbell & Meredith		50 00
	"Daily Province"		20 70
	Commission		92 33
	Sundries		2 75

ESTATE OF G. BARTON.

1920.			
Sept. 20.	To Armstrong & Hotson	$	25 50
	Commission		1 14

1920.	ESTATE OF PATRICK CORBETT.		
Aug. 18.	To Water	$	3 15
	"Daily Province"		1 35
	T. Matthews		5 00
	Taxes, Lot 13, Bk. 15, D.L. 196		99 05
	City Scavenger		16 00
	Ann Corbett		508 51

1920.	ESTATE OF WILLIAM H. CRUMMER.		
Jan. 15.	To W. A. Brown	$	7 35
	Water		4 20
	Anna J. Crummer		200 60
	Interest on mortgage		24 00
	Insurance on house		12 80
	Commission		45 52
	Transmission of title		8 25
	Dr. Riggs		50 00
	McTaggart & Ellis		5 00
	St. Paul's Hospital		50 00
	Sundries		5 60
	H. O. Alexander		481 21

CR.

ESTATE OF ELIZABETH BRADBURY.

1920.			
Jan. 2.	By Lot 10, Bk. 10, D.L. 183c	$	1,097 95

ESTATE OF JOHN BECK.

1920.			
April 28.	By Cash and effects	$	43 95
	Bank of Nova Scotia		105 00

ESTATE OF MABEL BERG.

1920.			
June 30.	By Cash and effects	$	49 94

ESTATE OF WILFRED J. BROUILETTE.

1920.			
Sept. 30.	By Merchants Bank	$	533 81
	Bank of Montreal		2,915 61

ESTATE OF AUGUSTUS BELL.

1920.			
Sept. 23.	By Cash and effects	$	63 92
	Launch		600 00
	Union Bank		1,170 06
	Bank of Montreal		12 81

ESTATE OF G. BARTON.

1920.			
Sept. 20.	By Cash and effects	$	26 64

1920.	ESTATE OF PATRICK CORBETT.		
Aug. 18.	By Lot 13, Bk. 15, D.L. 196	$	100 00

1920.	ESTATE OF WILLIAM H. CRUMMER.		
Jan. 15.	By Rent	$	52 00
	Lot 8, Bk. 46, D.L. 200a		838 40

DR.

ESTATE OF HENDRICK CARTOEF.

1920.		
Mar. 20. To Farris & Emerson	$	34 70
Commission		6 11
T. Edwards Co.		115 50
Probate duty		4 75
Taxes, D.L. 2690		35 04
Sundries		3 40

ESTATE OF MATTHEW CURRY.

1920.		
Jan. 31. To Water	$	10 20
Fire insurance		72 00
D. Bowes		8 40
Commission		19 25
"Daily Province"		13 00
M. Stiven		7 75
Stewart & Willey		50 00
Taxes, Lot 36, Bk. 40, D.L. 541		210 33
Plumbing repairs		7 75

ESTATE OF ALEXANDER CUNNINGHAM.

1920.		
Jan. 6. To Sundries	$	1 20
Probate duty		21 43

ESTATE OF JOHN CRAIB.

1920.		
Feb. 3. To Commission	$	0 23
Robert Craib		103 02
B. J. Allen		103 02
Mary Wist		103 02

ESTATE OF CHU SEN.

1920.		
July 29. To Consul for China	$	462 50

ESTATE OF WILLIAM CRAWFORD.

1920.		
Feb. 5. To Commission	$	127 97
Taxes		101 47
Water		6 00
Sundries		1 50

ESTATE OF AURELIUS CLARKE.

1920.		
Feb. 28. To Center & Hanna	$	50 00
Ellis & Brown		24 30
"Daily Sun"		18 90
Commission		20 37
W. Abram		27 50
Sundries		3 00

ESTATE OF JAMES CARNEY.

1920.		
June 1. To M. Akaxana	$	63 30
M. A. MacDonald		55 00
T. J. Kearney & Co.		160 00
Commission		72 10
"Daily Sun"		16 80
Sundries		1 50

ESTATE OF JOHN COX.

1920.		
Mar. 31. To "Daily Sun"	$	5 60
Perry & Mack		110 00
J. Oliver		15 00
Grand Hotel		15 00
Commission		10 78
Sundries		2 00

ESTATE OF THOS. D. CUMMING.

1920.		
Jan. 31. To Taxes, Lot 13, Bk. 25, Bk. 11	$	35 00

ESTATE OF ALMINA E. CARSCALLEN.

1920.		
Aug. 31. To Canadian Coal Co.	$	13 00
T. W. Jeffs		2 00
Commission		40 66
Nunn & Thomson		109 00
"Daily Sun"		20 40
Sundries		3 75

ESTATE OF ANN CORBETT.

1920.		
Sept. 30. To "The World"	$	18 70
Ellis & Brown		45 55
Commission		162 30
Provincial Mental Hospital.		2,104 86
Sundries		3 00

CR.

ESTATE OF MATTHEW CURRY.

1920.		
Jan. 31. By Rents	$	385 00

ESTATE OF WILLIAM CRAWFORD.

1920.		
Feb. 5. By Rents	$	39 60
Lot 22 Bk. 96, D.L. 550		332 50
Lot 3, Bk. 87, D.L. 549		777 00
Lot 6, Bk. 87, D.L. 549		1,092 34
Lot 2, Bk. 87, D.L. 549		300 00
Refund of taxes		11 68

ESTATE OF AURELIUS CLARKE.

1920.		
Feb. 28. By Cash	$	0 45
Effects		30 00
Union Bank		303 00
Trojan oil shares		74 00

ESTATE OF JAMES CARNEY.

1920.		
June 1. By Cash	$	101 70
Bank of Commerce		1,340 47

ESTATE OF JOHN COX.

1920.		
Mar. 31. By Cash	$	14 25
Bank of Nova Scotia		201 30

ESTATE OF THOS. D. CUMMING.

1920.		
Jan. 31. By Rents	$	48 80

ESTATE OF ALMINA E. CARSCALLEN.

1920.		
Aug. 31. By Cash	$	10 90
Furniture and effects		660 95
Bank of Commerce		141 50

ESTATE OF ANN CORBETT.

1920.		
Sept. 30. By P. Corbett Estate	$	508 51
Lot 13, Bk. 15, D.L. 196		2,507 62

DR.

ESTATE OF ROBERT CAMERON.

1920.		
Nov. 30. To Probate duty	$	32 86
Tupper & Bull		99 50
"Daily Sun"		23 80
A. W. Stone		48 00
Commission		178 83
Sundries		2 75

ESTATE OF JAMES J. COLLETT.

1920.		
Nov. 30. To F. D. Markland	$	23 00
Commission		23 53
H. D. Hulme		30 00
"Daily Province"		13 65
Harron Bros.		150 00
Sundries		50

ESTATE OF JOSEPH DE SILVA.

1920.		
Feb. 28. To Taxes	$	6 23
Commission		10 05
Sundries		2 00

ESTATE OF VALENTINO DAPOTO.

1920.		
July 31. To Probate duty	$	55 82
Italian Consul		4,500 00
Taxes, Lot 16, Bk. 9, D.L. 622		3 77
Taxes, Lot 20, Bk. 22, D.L. 182		63 34
Sundries		1 20

ESTATE OF GEORGE H. DARLING.

1920.		
Mar. 31. To Taxes, Lot 8, Sec. 13, Tp. 16	$	11 90
Taxes, Lot 47, Bk. 14, D.L. 50		37 44
Probate duty		3 43
Commission		35 00
Sundries		2 00
Lane, Wood & Co.		152 06

ESTATE OF GEORGE DYKER.

1920.		
Jan. 2. To Half Lot 2, N.W. ½, Sec. 2, Tp. 12	$	36 60
A. Kellar		36 90
MacInnis & Arnold		36 17
Commission		500 00
Mary Dyker		4 27
Probate duty		9 90
"The World"		5 20

ESTATE OF WILLIAM A. DOUGAN.

1920.		
June 30. To Tupper & Bull	$	73 80
Probate duty		10 00
Commission		52 75
Wm. Dougan		850 00
"The World"		11 25
Sundries		1 50

ESTATE OF MIKE DUEMCHUK.

1920.		
Jan. 31. To Commission	$	6 62
J. Oliver		17 50
T. Edwards Co.		105 99
Sundries		2 35

ESTATE OF JABEZ D. DEWITT.

1920.		
April 30. To Interest on mortgage	$	45 00
Scrimgeour & Hogg		38 50
Commission		27 83
Repairs to house		15 40
Sundries		4 00
"Daily Sun"		17 50
Interest on mortgage		28 00
Taxes, Lot 5, Bk. 3, Lot 7, D.L. 9		16 20
Taxes, W. ½ Lot 5, Bk. 12, D.L. 526		31 00
Taxes, Lot 12, Bk. 216, D.L. 526		40 63
M. Moore		55 00
Dr. W. H. Lang		50 00
Clubb & Stewart		10 70

CR.

ESTATE OF ROBERT CAMERON.

1920.		
Oct. 31. By Cash	$	55 30
Anglo B.C. Packing Co.		601 96
B.C. Packers' Association		200 00
Launch		825 00
Logs		919 66
Shack and effects		80 00
Royal Bank		894 73

ESTATE OF JAMES J. COLLETT.

1920.		
Nov. 30. By Cash and effects	$	460 70

ESTATE OF JOSEPH DE SILVA.

1920.		
Feb. 28. By Lots 11, 12, Bk. 11, D.L. 151, 153	$	200 00

ESTATE OF VALENTINO DAPOTO.

1920.		
July 31. By Refund of taxes	$	24 51

ESTATE OF GEORGE DYKER.

1920.		
Jan. 2. By Cash	$	250 00

ESTATE OF WILLIAM A. DOUGAN.

1920.		
June 30. By Standard Life Assurance Co.	$1,055	00

ESTATE OF MIKE DUEMCHUK.

1920.		
Jan. 31. By Cash	$	130 96
Effects		1 50
T. Edwards Co.		44 59

ESTATE OF JABEZ D. DEWITT.

1920.		
April 30. By Cash	$	0 27
Effects		25 50
Rents		290 00
Lot 5, Bk. 312, D.L. 526		290 75

DR.

ESTATE OF ALEK DUTCHAK.

1920.			
Nov. 30.	To Farris & Emerson	$	33 65
	Commission		27 87
	"Daily Sun"		5 60
	Sundries		2 05

ESTATE OF THEOPHILUS EDMUNDS.

1920.			
Aug. 31.	To Mary Humphrey	$	958 14
	Ann Richards		958 15
	W. D. Edmunds		958 15

ESTATE OF REGINALD T. EAGER.

1920.			
Feb. 28.	To T. Matthews	$	200 00
	Burns & Walkem		251 15
	Transmission of title		11 90
	Taxes, Lot 8, Bk. 21, D.L. 540, 192		247 51
	Taxes, Lot 8, Bk. 84, D.L. 540		138 55
	Isabell Eager		350 00
	Taxes, Lots 11, 12, Bk. 32, 33, D.L. 192		133 54
	Insurance on house		80 00
	Commission		92 83
	Water		10 20

ESTATE OF WALTER E. EGLINGTON.

1920.			
July 31.	To Florence E. Eglington	$	761 76

ESTATE OF JOHN P. EVANS.

1920.			
Feb. 28.	To "Daily Province"	$	14 25
	H. D. Hulme		30 40
	Nunn, Thomson & Co.		125 00
	Probate duty		13 17
	Commission		33 97
	Sundries		4 80
	Mary J. Cook		457 91

ESTATE OF RICHARD C. ELWELL.

1920.			
May 31.	To "Daily Sun"	$	7 50
	Williams, Walsh, McKim & Housser		35 85
	Commission		39 60
	Florence C. Elwell		709 35

ESTATE OF EDWARD SMITH EDWARDS.

1920.			
May 31.	To "Daily Sun"	$	7 50
	McTaggart & Ellis		41 85
	H. Mitchell		50 00
	T. J. Kearney & Co.		151 00
	Dr. E. Bolton		10 00
	Commission		177 52
	Charles H. Watson		101 44
	Sundries		7 00

ESTATE OF CLAUS EHLER.

1920.			
July 31.	To Congdon, Campbell & Meredith	$	27 05
	D. Subert		37 00
	T. J. Kearney & Co.		50 00
	Commission		15 43
	Sundries		2 00

ESTATE OF ERICK ERICKSON.

1920.			
Sept. 30.	To Sidney Marshall	$	18 00
	R. Wilson		29 00
	"Daily Province"		21 60
	Congdon, Campbell & Meredith		46 50
	Commission		118 89
	Sundries		1 40

ESTATE OF FREDERICK FREEMAN.

1920.			
May 31.	To Mount Pleasant Undertakers	$	89 00
	Commission		39 47
	Sundries		2 00

ESTATE OF WALTER J. FRAME.

1920.			
Feb. 28.	To Commission	$	64 83
	Bessie Frame		69 21
	"The World"		10 35
	Taxes on land		619 80
	Scrimgeour & Hogg		312 40
	Sundries		6 25

CR.

ESTATE OF ALEK DUTCHAK.

1920.			
Nov. 30.	By Cash	$	87 10
	Bank of Montreal		450 55

ESTATE OF REGINALD T. EAGER.

1920.			
Feb. 28.	By Rents	$	372 00
	W. ½ Lot 2, Bk. 24, D.L. 540		729 80

ESTATE OF JOHN P. EVANS.

1920.			
Feb. 28.	By Bank of Montreal	$	437 25
	Imperial Bank		242 25

ESTATE OF RICHARD C. ELWELL.

1920.			
May 31.	By Sub. C. Bk. 158, D.L. 264A	$	792 30

ESTATE OF EDWARD SMITH EDWARDS.

1920.			
May 31.	By Cash	$	50 30
	Bonds		645 10
	Bank of Commerce		2,855 05

ESTATE OF CLAUS EHLER.

1920.			
July 31.	By Cheques	$	83 54
	Dow-Fraser Trust Co.		225 00

ESTATE OF ERICK ERICKSON.

1920.			
Sept. 30.	By Wages and cash	$	357 91
	Bank of Commerce		2,019 87

ESTATE OF FREDERICK FREEMAN.

1920.			
May 31.	By Lots 20–23, Bk. 14, D.L. 2023	$	776 99

ESTATE OF WALTER J. FRAME.

1920.			
Feb. 28.	By Nugget shares	$	280 00
	Trojan shares		72 00
	Lot 1, Bk. 2, D.L. 80		25 00

DR.

ESTATE OF B. W. FROST.

1920.			
Feb. 28.	To A. L. Bancroft	$	30 79
	"Daily Province"		14 25
	Commission		24 40
	B. W. Frost		208 59
	Louisa Frost		208 59
	Sundries		1 35

ESTATE OF KENNETH FORBES.

1920.			
Feb. 28.	To Joseph Oliver	$	22 75
	Dr. Spankie		50 00
	General Hospital		16 00
	Commission		15 72
	"The World"		9 90
	Sundries		1 85

ESTATE OF HEISAKU FUJIMOTO.

1920.			
July 31.	To J. & G. Robertson	$	22 60
	"Daily Province"		7 70
	Commission		5 95
	Sundries		1 35
	Kolo Yoshida		81 51

ESTATE OF JOB GREASLEY.

1920.			
Jan. 31.	To "Daily Sun"	$	5 60
	A. T. Westerlund		50 00
	Probate duty		404 56
	Succession duty		384 34
	A. T. Westerlund		27 98
	J. T. Abrey		206 20
	A. U. Whiteside & Co.		138 88
	Sundries		5,547 01
	"		1 20

ESTATE OF GOLS.

1920.			
July 31.	To Deputy Commissioner, Punjab	$1,024	69

ESTATE OF HJALMER GUSTAVSON.

1920.			
Mar. 31.	To Consul for Sweden	$	537 57

ESTATE OF PETER GRANT.

1920.			
May 31.	To Probate duty	$	2 01
	Sundries		1 20
	M. S. Black		106 37

ESTATE OF JOHN M. GRAHAM.

1920.			
Jan. 31.	To Commission	$	7 87
	S. B. Graham		70 06
	A. C. Graham		70 06
	H. W. Graham		70 05

ESTATE OF ANDREW GROVEN.

1920.			
Jan. 31.	To Commission	$	108 35
	"Daily Province"		20 80
	Nunn, Thomson & Co.		154 25
	Probate duty		20 12
	M. A. MacDonald		46 55
	Sundries		3 45
	John K. Kollem		906 73
	Anna Hjildness		906 73

ESTATE OF JUSTUS W. HOWISON.

1920.			
Mar. 31.	To Commission	$	152 90
	Paterson Manufacturing Co.		19 82
	Smith & Bryson		37 30
	McClary Manufacturing Co.		148 64
	Marshall Wells Co.		146 09
	Imperial Oil Co.		38 00
	Mark Dumond		40 05
	Cunningham's, Limited		21 15
	Taxes on land		77 44

CR.

ESTATE OF B. W. FROST.

1920.			
Feb. 28.	By Bank of Montreal	$	299 40
	Insurance		48 57
	Half-share, motor-boat		140 00

ESTATE OF KENNETH FORBES.

1920.			
Feb. 28.	By Bank of Commerce	$	334 46

ESTATE OF HEISAKU FUJIMOTO.

1920.			
July 31.	By Royal Bank	$	119 11

ESTATE OF EDWARD P. FELLOWS.

1920.			
Oct. 31.	By Rowboat	$	60 00

ESTATE OF JOHN M. GRAHAM.

1920.			
Jan. 31.	By Lot 31, W. ½, Bk. 15, D.L. 191, 192	$	157 50

ESTATE OF ANDREW GROVEN.

1920.			
Jan. 31.	By Royal Bank	$2,123	98

ESTATE OF MICHAEL GREEN.

1920.			
Aug. 31.	By Cash and effects	$	41 00

ESTATE OF JUSTUS W. HOWISON.

1920.			
Mar. 31.	By Collins & Foot	$	2 24

DR.

ESTATE OF CHARLES E. HAMILTON.

1920.			
Mar. 31.	To E. R. Hamilton	$1,500	00
	Commission	5	00
	Indemnity bond	28	00
	Adamson & Lindsay	6	00

ESTATE OF WM. HENNAN.

1920.			
June 30.	To Taxes on land	$ 40	68

ESTATE OF MATTIE HARPER.

1920.			
Jan. 31.	To Commission	$ 7	15
	Scrimgeour & Hogg	9	50

ESTATE OF KATE E. HENWOOD.

1920.			
Jan. 6.	To R. B. Ellis	$ 13	28
		1	20
	H. O. Alexander (infant guardian)	571	16

ESTATE OF JOHN H. HUTCHINSON.

1920.			
Jan. 31.	To P. J. McIntyre	$ 31	70
	Independent Undertaker	159	00
	Commission	50	00
	Sundries	1	25
	H. O. Alexander	758	05

ESTATE OF CHARLES R. P. HILLARY.

1920.			
Jan. 31.	To Commission	$ 76	60
	Sundries	7	77
	M. A. MacDonald	42	65
	"The World"	9	90
	Probate duty	15	32
	C. Hillary	459	96
	M. Hillary	459	96
	G. Hillary	459	96

ESTATE OF JOHN HALEY.

1920.			
Mar. 31.	To A. Daley	$ 15	00
	J. Connely	20	00
	J. Oliver	24	75
	Commission	70	68
	"The World"	10	35
	Probate duty	12	23
	T. Edwards Co.	120	50
	Sundries	2	70
	Dr. H. MacMillan	35	00

ESTATE OF ROSINA M. HAMMOND.

1920.			
May 31.	To "Daily Province"	$ 7	05
	McTaggart & Ellis	29	20
	Commission	12	43
	McTaggart & Ellis	14	75
	Sundries	2	35
	Probate duty	1	42
	G. R. Hammond	76	51

ESTATE OF K. HARADO.

1920.			
June 30.	To Commission	$ 6	39
	Scrimgeour & Hogg	22	15
	Sundries		35

ESTATE OF EDWARD F. HILL.

1920.			
Aug. 31.	To J. Oliver	$ 21	25
	Sundries	9	26
	Louis Hill	54	69

ESTATE OF KATHLEEN T. IRVING.

1920.			
July 31.	To G. R. Long	$ 38	25
	Commission	25	32
	G. E. Seldon	27	72
	"The World"	7	50
	Sundries	1	50
	R. K. Irving	376	20

ESTATE OF ANTHONY J. JOHNSON.

1920.			
Mar. 31.	To Savage & Roberts	$ 41	60

CR.

ESTATE OF CHARLES E. HAMILTON.

1920.			
Mar. 31.	By Personal property	$ 100	00

ESTATE OF MATTIE HARPER.

1920.			
Jan. 31.	By Metropolitan Life Insurance Co.	$ 143	20
	Personal property	67	50

ESTATE OF CHARLES R. P. HILLARY.

1920.			
Jan. 31.	By Cash and effects	$ 88	51
	Bank of Commerce	456	97
	Phoenix Assurance Co.	986	64

ESTATE OF JOHN HALEY.

1920.			
Mar. 31.	By Effects	$ 3	00
	Bank of Commerce	1,410	74

ESTATE OF ROSINA M. HAMMOND.

1920.			
May 31.	By Bank of Nova Scotia	$ 143	71

ESTATE OF K. HARADO.

1920.			
June 30.	By Wages	$ 127	84

ESTATE OF EDWARD F. HILL.

1920.			
Aug. 31.	By Bank of Montreal	$ 85	20

ESTATE OF KATHLEEN T. IRVING.

1920.			
July 31.	By Royal Bank	$ 506	49

ESTATE OF ANTHONY J. JOHNSON.

1920.			
Mar. 31.	By J. C. Forrister	$ 61	94

DR.

ESTATE OF FLORENCE JOHNSON.

1920.		
May 31. To Wilson & Jamieson	$	33 50
"Daily Province"		7 05
W. S. Baird		150 00
Commission		82 78
Taxes, Lots 5, 6, Bk. 8, 9, D.L. 52		14 05
Sundries		2 50
H. O. Alexander		1,375 39

ESTATE OF WILLIAM KIRCHER.

1920.		
May 31. To P. Kircher	$	52 41
Peter Kircher		52 41
J. Kircher		52 41
H. Schinett		52 41
P. Kircher		52 41

ESTATE OF GUSTAV A. KARZONINKAT.

1920.		
Mar. 31. To Commission	$	11 25
Taxes, Lot 10, Bk. 106, D.L. 526		13 66
Adam S. Johnson		85 08
Sundries		3 20

ESTATE OF EMIL KARLSON.

1920.		
Mar. 31. To Commission	$	2 46
Sundries		1 35
E. H. M. Ostrom		45 47

ESTATE OF JOHN A. KEENAN.

1920.		
May 31. To Farris and Emerson	$	52 90
"Daily Province"		13 65
Commission		256 71
R. Crosby		5 00
Mitchell & Cohill		123 95
Center & Hanna		191 25
Vancouver Drug Co.		5 10
Sarah Scott		219 27
H. O. Alexander		500 00
Insurance premium		24 00
Hobson & Co.		38 00
Sundries		13 60
Vancouver City Waterworks		5 10
Vancouver City taxes		52 59

ESTATE OF JALMARI KOSKI.

1920.		
June 30. To Commission	$	9 78
Sundries		1 35
Scrimgeour & Hogg		22 15

ESTATE OF WILLARD V. KENNEDY.

1920.		
Oct. 31. To Commission	$	6 50
Hotel Stirling		6 50

ESTATE OF DANIEL LONG.

1920.		
Aug. 31. To Clearing lots	$	20 00
T. Matthews		10 00
Commission		115 19
Sundries		3 50
Taxes		847 34
Probate duty		25 87
Succession duty		380 41
Interest		68 97

ESTATE OF THOMAS LITTLE.

1920.		
May 31. To John Little	$	450 00
Taxes, Lot 34, Bk. 241, D.L. 544		8 25

ESTATE OF LAL SINGH.

1920.		
Oct. 31. To P. J. MacKay	$	40 80
Crehan, Mouat & Co.		10 00
P. J. MacKay		25 75
"		32 40
Sundries		2 00
Griffith Jones		434 30
A. H. MacNeill		297 30

ESTATE OF ERNEST LUNDIN.

1920.		
Jan. 31. To Death certificate	$	0 75
Albin Lundin		956 72

CR.

ESTATE OF FLORENCE JOHNSON.

1920.		
May 31. By Bank of Montreal	$	655 57
Lots 5, 26, Bk. 8, 9, D.L. 52		1,000 00
James Johnson		9 70

ESTATE OF GUSTAV A. KARZONINKAT.

1920.		
Mar. 31. By Lot 12, Bk. 1, S.E. ¼, Sec. 21	$	200 00

ESTATE OF EMIL KARLSON.

1920.		
Mar. 31. By Wages	$	49 28

ESTATE OF JOHN A. KEENAN.

1920.		
May 31. By Merchants Bank	$1,103	92
Bank of Commerce		151 78
Bond interest		5 50
Mutual Life Insurance Co.	2,099	92
Automobile		975 00
Returned premium		18 00

ESTATE OF JALMARI KOSKI.

1920.		
June 30. By Cash and effects	$	18 50
Royal Bank		177 03

ESTATE OF WILLARD V. KENNEDY.

1920.		
Oct. 31. By Cash	$	130 00

ESTATE OF DANIEL LONG.

1920.		
Aug. 31. By Lots 6, 7 E., Bk. 174, D.L. 264A	$	750 00
Lots 11, 12, Bk. 158D, D.L. 264A		797 32
Lots 6, 7 E., Bk. 174, D.L. 264A		756 50
Refund of taxes		48 16

ESTATE OF LAL SINGH.

1920.		
Oct. 31. By Royal Bank	$	8 15

DR.

ESTATE OF GEORGE LISCOMBE.

1920.			
April 30.	To Lovina Liscombe	$	199 56
	S. L. Stewart		133 04
	H. O. Liscombe		133 04
	M. R. Liscombe		133 04
	Sundries		1 20

ESTATE OF JAMES LYNCH.

1920.			
Jan. 31.	To "Daily Province"	$	9 90
	G. R. Long		25 60
	Commission		21 77
	Probate duty		4 35
	Sundries		2 55
	Mary Lynch		371 34

ESTATE OF LAM SING.

1920.			
Jan. 31.	To Commission	$	87 79
	Dr. W. F. Shaw		10 00
	James Law		100 00
	T. Edwards Co.		438 50
	"Daily Sun"		6 00
	Van Roggen & Wallace		95 00

ESTATE OF MAUD LYONS.

1920.			
Jan. 31.	To Scrimgeour & Hogg	$	28 70
	Mount Pleasant Undertakers		92 00
	"Daily Sun"		21 00
	Jno. S. Rankin		10 00
	Commission		32 25
	Dr. D. D. Murray		1 25
	Sundries		406 00
Feb. 23.	Dr. W. D. Murray		52 50

ESTATE OF STEPHEN LEWIS.

1920.			
July 31.	To "Daily Sun"	$	5 60
	Commission		21 15
	Sundries		22 50
	R. M. MacDonald		393 67

ESTATE OF STEPHEN LANGER.

1920.			
Sept. 30.	To Independent Undertakers	$	44 36
	Commission		2 33
Oct. 21.	Commission, etc.		31 77

ESTATE OF HARRY LEES.

1920.			
Oct. 31.	To R. P. Allen	$	6 00
	Probate duty		5 44
	"Daily Sun"		5 60

ESTATE OF JENNIE E. MASON.

1920.			
Jan. 31.	To McKay & O'Brien	$	81 10
	Commission		187 50
	Bird, MacDonald & Co.		162 00
	William Bampton		2,175 66
	J. Carson		99 70

ESTATE OF ERNEST A. MORGAN.

1920.			
May 31.	To Ben Morgan	$	750 00
	Taxes, Lot 1, Bk. 1, D.L. 11		13 63

ESTATE OF BENJAMIN MITCHELL.

1920.			
Jan. 31.	To Annie Mitchell	$	741 57

ESTATE OF GERARD MOHRING.

1920.			
Feb. 28.	To Commission	$	2 35
	A. Oettigen		307 14

ESTATE OF CASPER MILLER.

1920.			
Jan. 31.	To Commission	$	17 07
	Funeral		94 00
	"Daily Sun"		11 20
	N. P. Buckingham		24 50
	Sundries		85

CR.

ESTATE OF MAUD LYONS.

1920.			
Jan. 31.	By Furniture and effects	$	644 90

ESTATE OF STEPHEN LEWIS.

1920.			
July 31.	By Cash	$	59 00
	Royal Bank		363 92

ESTATE OF STEPHEN LANGER.

1920.			
Sept. 30.	By Cash and effects	$	46 69
Oct. 6.	Remitted to Treasury		635 45

ESTATE OF HARRY LEES.

1920.			
Oct. 31.	By Wages	$	33 44

ESTATE OF JENNIE E. MASON.

1920.			
Jan. 31.	By Lots 1 to 12, D.L. 1319	$	3,750 00
	William Bampton		408 36

ESTATE OF PETER I. MOORE.

1920.			
May 31.	By Rents	$	154 06

DR.

ESTATE OF FRANK MAKOFF.

1920.			
Jan. 31.	To Dr. Spankie	$	20 00
	"Daily Sun"		9 60
	Farris & Emerson		28 50
	Commission		17 14
Mar. 25.	District Registrar, Vancouver		2 92
	William Makoff		232 04

ESTATE OF JOHN MARSHALL.

1920.			
Mar. 31.	To Ladner & Cantelon	$	55 10
	A. H. MacNeill		13 00
	"Daily Sun"		11 20
	Commission		28 35
	Sundries		2 50
	John Marshall		456 85

ESTATE OF JESSIE M. MONTGOMERY.

1920.			
April 30.	To M. E. McLennan	$	24 00
	H. Angelus		10 50
	General Hospital		14 20
	Mount Pleasant Undertakers		5 00
	H. W. Riggs		25 00
	Commission		63 18
	Sundries		2 50
	Center & Hanna		195 00
	M. Leigh		24 00
	Sarah Stone		563 70
	Wilson, Whealler & Symes		74 52
	Sarah Stone		262 10

ESTATE OF LEWIS MARTIN.

1920.			
May 31.	To T. Edwards Co.	$	203 00
	Commission		102 14
	Taxes, Lots 29, 30, Bk. 9, D.L. 171		33 23
	McGill & Coady		47 55
	"Daily Province"		27 90
	Probate duty		18 39
	Sundries		2 95

ESTATE OF JOHN H. MULLEN.

1920.			
June 30.	To Commission	$	5 63
	T. J. Kearney & Co.		70 00
	Sundries		1 92

ESTATE OF LOUIS MANSON.

1920.			
July 31.	To Probate duty	$	4 74
	Kerstin Manson		100 00
	Sundries		1 20

ESTATE OF ROBERT W. MOORE.

1920.			
Sept. 30.	To Commission	$	11 30
	Sundries		50

ESTATE OF JOHN C. MCCAULEY.

1920.			
Aug. 31.	To Martha Smith	$	98 60
	James McGee		98 59
	Maria McGee		394 32

ESTATE OF PATRICK MCCABE.

1920.			
Dec. 31.	To McTaggart & Ellis	$	23 60
	Commission		6 00

ESTATE OF DUNCAN MCDOUGALL.

1920.			
Sept. 30.	To Interest on mortgage	$	275 30
	Commission		25 52
	Insurance		50 22
	Taxes, Lot 19, Lot 52		94 35
	Sundries		1 20

ESTATE OF ALFRED MCDONALD.

1920.			
Feb. 28.	To Probate duty	$	31 28
	R. Matthews		15 00
	Julia McDonald		478 13
	Sundries		1 20

CR.

ESTATE OF FRANK MAKOFF.

1920.			
Jan. 31.	By Bank of Commerce	$	312 90

ESTATE OF JOHN MARSHALL.

1920.			
Mar. 31.	By Royal Bank	$	567 60

ESTATE OF KATE MALLETT.

1920.			
Feb. 28.	By Furniture and effects	$	180 00

ESTATE OF JESSIE M. MONTGOMERY.

1920.			
April 30.	By Merchants Bank	$	700 00
	Bank of Montreal		563 70

ESTATE OF LEWIS MARTIN.

1920.			
May 31.	By Cash	$	10 40
	Imperial Bank		2,032 34

ESTATE OF JOHN H. MULLEN.

1920.			
June 30.	By Cash and effects	$	49 66
	Shingle-bolts		63 00

ESTATE OF DAVID MULLAM.

1920.			
Dec. 31.	By Wages and effects	$	12 57

ESTATE OF ROBERT W. MOORE.

1920.			
Sept. 30.	By Personal property	$	226 10

ESTATE OF PATRICK MCCABE.

1920.			
Dec. 31.	By Payments on land	$	175 00

ESTATE OF DUNCAN MCDOUGALL.

1920.			
Sept. 30.	By Rents	$	342 75

DR.

ESTATE OF ELISHA T. MCGUIRE.

1920.			
Jan. 31.	To McTaggart & Ellis	$	42 90
	Commission		76 81
	Insurance		52 00
	Stirling & Co.		16 60
	McTaggart & Ellis		50 70
	Dr. Gillies		14 00
	Interest on mortgage		108 00
	Sundries		9 80
	"Daily Province"		19 55
	Harron Bros.		175 00

ESTATE OF DOUGLAS MCGREGOR.

1920.			
Feb. 28.	To Commission	$	36 27
	T. Edwards Co.		103 32
	T. W. Jeffs		14 70
	Probate duty		5 21
	MacInnis & Arnold		37 25
	"Daily Sun"		9 50
	Sundries		35

ESTATE OF EDWARD J. MACDONALD.

1920.			
Jan. 31.	To "Daily Province"	$	19 80
	McLeod Grocery		4 87
	Commission		191 38
	A. K. MacDonald		15 90
	J. A. Findlay		85 20
	Dr. Turnbull		23 20
	Taxes, Lots 13, 18, 19, Bk. 17, D.L. 2		30 52
	Probate duty		32 64
	J. A. Findlay		19 35
	Sundries		6 25
	Adamson & Lindsay		20 25
	E. S. J. Lowrie		365 33
	C. J. McCharles		365 33
	R. A. MacKay		365 34
	W. J. MacDonald		365 34
	J. A. MacDonald		365 34
	A. K. MacDonald		365 34
	E. A. MacDonald		365 34
	Patterson, Chandler & Co.		200 00

ESTATE OF ALEXANDER MCSWAN.

1920.			
Mar. 31.	To Commission	$	61 30
	Taxes, Lot 11, W. ½ 6, D.L. 93		9 23
	"Daily Sun"		8 00
	Abbot & McRae		57 23
	Funeral		178 75
	A. V. Webster		55 00
	Taxes, Lot 11, Bk. 6, D.L. 93		5 25
	Sundries		3 50
	Deed and registering		9 71
	Angus McSwan		119 71
	K. McSwan		119 71
	P. McSwan		119 72
	N. McSwan		119 72
	J. McSwan		119 72
	F. McSwan		119 72
	C. McSwan		119 72

ESTATE OF ELLEN MCCANN.

1920.			
April 30.	To T. J. Kearney & Co.	$	318 00
	"Daily Province"		14 25
	McGill & Coady		42 40
	Probate duty		5 58
	General Hospital		35 05
	M. A. Mullhall		30 00
	K. P. Rico		9 00
	Commission		27 22
	Sundries		1 50

ESTATE OF JOHN MACKENZIE.

1920.			
Aug. 31.	To G. R. Long	$	31 75
	Commission		13 71
	Sundries		4 60
	M. MacKenzie		224 15

1920. ESTATE OF JOHN A. MCCULLOUGH.

June 30.	To Funeral	$	52 25
	Commission		2 75

1920. ESTATE OF MALCOLM MACKAY.

Aug. 31.	To H. D. Hulm	$	27 50
	Commission		7 14
	Sundries		1 50

CR.

ESTATE OF ELISHA T. MCGUIRE.

1920.			
Jan. 31.	By Rent	$	180 00
	Royal Bank		351 87
	Lot 46, Bk. 104, D.L. 264A		919 95
	Effects		4 50
	Household effects		80 00

ESTATE OF DOUGLAS MCGREGOR.

1920.			
Feb. 28.	By Cash and effects	$	124 60
	Bank of Montreal		600 80

ESTATE OF EDWARD J. MACDONALD.

1920.			
Jan. 31.	By Union Bank	$1,106 89	
	"		100 83
	London & Lancashire Life Assurance Co.		1,000 00
	Monarch Life Insurance Co.		1,000 00

ESTATE OF ALEXANDER MCSWAN.

1920.			
Mar. 31.	By Bank of Montreal	$	900 71
	Royal Bank		312 08
	Cash		13 20

ESTATE OF ELLEN MCCANN.

1920.			
April 30.	By Cash	$	35 00
	Bank of Commerce		509 32

ESTATE OF JOHN MACKENZIE.

1920.			
Aug. 31.	By Sun Life Insurance Co.	$	274 21

1920. ESTATE OF JOHN A. MCCULLOUGH.

June 30.	By Boat and launch	$	55 00

1920. ESTATE OF MALCOLM MACKAY.

Aug. 31.	By Effects	$	67 00
	Royal Bank		75 85

DR.

ESTATE OF CHARLES MCLAUGHLIN.

1920.			
Aug. 31.	To St. George's Hospital	$	26 00
	R. Matthews		42 00
	Commission		4 92
	Sundries		1 85

ESTATE OF JOHN NOONAN.

1920.			
Jan. 31.	To Commission	$	35 62
	A. W. Whiteside & Co.		31 65
	Probate duty		7 84
	F. Noonan		357 25
	H. Noonan		357 26

ESTATE OF CELESTE NEGRIN.

1920.			
Feb. 28.	To Probate duty	$	5 96
	Sundries		1 20
	G. Negrin		515 80

ESTATE OF JOSEPH NIENAZNY.

1920.			
Dec. 31.	To "Daily Province"	$	14 90
	H. D. Hulme		43 90
	M. T. McKetch		54 00
	General Hospital		39 40
	Commission		273 94
	H. McIssac		5 00
	T. Edwards Co.		208 50
	Sundries		8 25

ESTATE OF AXIL NILSEN.

1920.			
May 31.	To "Daily Province"	$	7 05
	Ellis & Brown		38 55
	Probate duty		2 58
	Commission		13 09
	Sundries		3 00
	C. B. Stahlschmidt		197 45

ESTATE OF TYCKO OGREN.

1920.			
Jan. 31.	To Taxes, Lot 17, Bk. 20, D.L. 200	$	16 25
	Swedish Consul		135 30

ESTATE OF PIETRO D. ODORICA.

1920.			
Feb. 7.	To R. B. Ellis	$	1 20

ESTATE OF GUSTAF OSBERG.

1920.			
Oct. 31.	To Kearney & Co.	$	28 00
	Commission		7 37
	J. Oliver		14 15
	P. Osberg		91 96
	"Daily Sun"		3 00
	Sundries		2 90

ESTATE OF THOMAS OBORNE.

1920.			
Jan. 31.	To J. Oliver	$	21 00
	"Daily Sun"		8 40
	Armstrong & Hotson		70 37

ESTATE OF FRANK OEHELR.

1920.			
Mar. 31.	To Commission	$	7 93
	J. Oliver		15 80
	Kearney & Co.		65 00
	St. Paul's Hospital		21 90
	Dr. Murphy		25 00
	"Daily Sun"		5 20
	Sundries		1 35

ESTATE OF JOHN O'BRIEN.

1920.			
April 30.	To Commission	$	12 42
	Sundries		50

ESTATE OF ERICK ORN.

1920.			
July 31.	To J. Oliver	$	25 50
	Commission		7 44
	Sundries		1 35

ESTATE OF ALLAN G. PADBURY.

1920.			
May 31.	To Commission	$	25 55
	Nunn, Thomson & Co.		50 00
	Probate duty		5 60
	"Daily Sun"		5 00
	Corbould & Grant		34 59
	Sundries		1 35
	J. Padbury		194 52
	L. Padbury		194 53

CR.

ESTATE OF CHARLES MCLAUGHLIN.

1920.			
Aug. 31.	By Cash	$	70 00
	Effects		28 75

ESTATE OF JOHN NOONAN.

1920.			
Jan. 31.	By A. M. Whiteside	$	150 00

ESTATE OF JOSEPH NIENAZNY.

1920.			
Dec. 31.	By Effects	$	43 00
	Cash		41 00
	Bank of Montreal		1,223 23
	Imperial Bank		1,044 12
	Bonds		317 78
	W.S. certificates		1,250 00
	P.O. savings		847 57
	North West Savings Co.		712 05

ESTATE OF AXIL NILSEN.

1920.			
May 31.	By Bank of Commerce	$	261 72

ESTATE OF GUSTAF OSBERG.

1920.			
Oct. 31.	By Cash and effects	$	147 38

ESTATE OF THOMAS OBORNE.

1920.			
Jan. 31.	By Royal Bank	$	99 57

ESTATE OF FRANK OEHELR.

1920.			
Mar. 31.	By Cash	$	47 44
	Watch		6 00
	Bank of Montreal		6 81
	War bond		98 22

ESTATE OF JOHN O'BRIEN.

1920.			
April 30.	By Veterans' gratuity	$	248 37

ESTATE OF ERICK ORN.

1920.			
July 31.	By Cash	$	48 78
	Union Bank		100 00

ESTATE OF ALLAN G. PADBURY.

1920.			
May 31.	By Royal Bank	$	317 64

DR.			CR.		
ESTATE OF DANIEL PATTERSON.			**ESTATE OF DANIEL PATTERSON.**		
1920.			1920.		
Mar. 31. To Commission	$	12 90	Mar. 31. By Veterans' gratuity	$	261 73
Imperial Veterans		3 00			
Sundries		35			
ESTATE OF CHARLOTTE E. PARK.			**ESTATE OF CHARLOTTE E. PARK.**		
1920.			1920.		
Dec. 31. To Commission	$	10 00	Dec. 31. By Abbott McRae & Co.	$	50 00
ESTATE OF ATTILIO PASQUINELLI.			**ESTATE OF ATTILIO PASQUINELLI.**		
1920.			1920.		
July 31. To Commission	$	6 50	July 31. By Cash	$	130 00
Sundries		35			
Mount Pleasant Undertakers		123 35			
ESTATE OF ALBERT E. PRETTY.			**ESTATE OF ALBERT E. PRETTY.**		
1920.			1920.		
Dec. 31. To Probate duty	$	28 29	Dec. 31. By Bank of Commerce	$2,914 92	
Commission		145 75			
Sundries		1 50			
ESTATE OF NELS PETERSON.			**ESTATE OF NELS PETERSON.**		
1920.			1920.		
Nov. 30. To Barney Hansen	$	50 00	Nov. 30. By Launch	$	275 00
Commission		18 40	Net		60 00
S. Bowell & Co.		114 00	Boat		10 00
J. Oliver		24 00	Effects		23 00
N. Premian & Co.		24 85			
Sundries		3 10			
ESTATE OF FRANCES J. RAINE.			**ESTATE OF FRANCES J. RAINE.**		
1920.			1920.		
Mar. 31. To Taxes, Lot 24, Bk. A, 30–4	$	12 02	Mar. 31. By Interest and rents	$	515 15
Interest on mortgage		200 00	Halstrom mortgage		200 00
Commission		25 75			
Taxes, Lots 8, 9, Bk. 26, D.L. 201		10 45			
Taxes, Lots L and M, Bk. 2, D.L. 192		83 41			
Probate duty		408 25			
Succession duty		849 63			
Interest on duty		135 95			
Taxes, Lots H and J, Bk. 2, D.L. 192		236 47			
Sundries		1 20			
ESTATE OF JOHN ROBB.			**ESTATE OF JOHN ROBB.**		
1920.			1920.		
Jan. 31. To Repairs on house	$	27 70	Jan. 31. By Rents	$	179 00
Water		6 30			
J. McCormick		27 70			
Commission		3 70			
Taxes, Lot 4, Bk. 371, D.L. 526		151 08			
ESTATE OF JOHN ROSE.			**ESTATE OF JOHN ROSE.**		
1920.			1920.		
Feb. 28. To Probate duty	$	8 36	Feb. 28. By Rifle	$	7 00
Sundries		1 20			
J. H. Rose		325 00			
ESTATE OF JACOB ROSENSTOCK.					
1920.					
Oct. 31. To S. Gintzburger	$1,088 68				
ESTATE OF JOHN REILLY.					
1920.					
Mar. 31. To K. Patterson	$	670 50			
M. Reilly		670 50			
H. Reilly		670 49			
ESTATE OF WILLIAM ROBERTSON.			**ESTATE OF WILLIAM ROBERTSON.**		
1920.			1920.		
Feb. 28. To Kearney & Co.	$	60 00	Feb. 28. By Bank of Montreal	$1,366 85	
Dr. Trousdale		28 00			
M. A. MacDonald		52 30			
Commission		68 34			
"Daily Sun"		13 20			
John Cameron, Jr.		68 66			
" Sr.		15 00			
Probate duty		12 10			
Sundries		7 95			
ESTATE OF JANE B. RICHARDS.			**ESTATE OF JANE B. RICHARDS.**		
1920.			1920.		
Nov. 30. To Commission	$	50 00	Nov. 30. By Lots 1, 2, 3, 4, Bk. 4, D.L. 274	$1,705 82	
"The World"		4 60			
Davis & Co.		1,651 22			
1920. **ESTATE OF SAMUEL ST. ONGE.**			1920. **ESTATE OF SAMUEL ST. ONGE.**		
Jan. 31. To Commission	$	70 88	Jan. 31. By Lots 23, 24, Bk. 18, D.L. 302	$1,533 95	
Exchange, etc.		10 55	Mar. 20 Remitted to Treasury		25 00
Marie St. Onge		550 00			

DR.

ESTATE OF ISABELLA M. SPEIRS.

1920.			
April 30.	To "Daily Province"	$	4 50
	Commission		182 86
	Water		14 50
	Wilson & Kitson		10 00
	J. D. Speir		510 08
	M. E. Sullivan		984 17
	A. D. MacKay		984 17
	B. L. Scoullar		984 17
	Sundries		1 50

ESTATE OF WILFRID C. SMITH.

1920.			
Feb. 28.	To Probate duty	$	8 15
	Sundries		1 20
	H. M. Smith		621 70

ESTATE OF GEORGE A. SANGSTER.

1920.			
Feb. 28.	To Probate duty	$	14 88
	H. Sangster		270 25
	D. E. Collison		270 22
	C. C. Sangster		270 22
	P. L. Sangster		270 22
	Sundries		1 20
May 29.	F. L. H. Sangster		270 22

ESTATE OF JOSEPH F. STARRY.

1920.			
May 31.	To Probate duty	$	16 53
	A. Starry		756 30
	F. Starry		756 31
	Sundries		1 20

ESTATE OF WILLIAM SUTHERLAND.

1920.			
April 30.	To District Registrar	$	77 20
May 31.	R. B. Ellis		1 20
July 31.	A. J. Murray		206 21
Sept. 30.	A. McKenzie		485 31
	A. Murray		189 55
	C. J. Vogel		189 55
	A. C. Sutherland		83 60
	H. A. Sutherland		83 60
	J. R. Sutherland		83 60
	C. J. Sutherland		83 60
	W. A. Sutherland		83 60
Nov. 30.	Mary Sutherland		167 29

ESTATE OF SUNDAR SINGH (No. 2).

1920.			
Oct. 31.	To Probate duty	$	18 75
	Harron Bros.		80 00
	Hamilton Read		71 65
	Commission		103 08
	"The World"		9 90
	General Hospital		8 25
	W. K. Hall		50 00
	Sundries		2 00
	L. Singh		1,717 99

ESTATE OF CHARLES C. STORRICK.

1920.			
May 31.	To Probate duty	$	32 23
	W. C. Storrick		1,008 58
	M. J. Storrick		1,008 59
	Sundries		1 20

ESTATE OF GIOVANNI SILLANI.

1920.			
Jan. 31.	To "The World"	$	10 80
	F. F. Hurley		31 85
	Commission		23 25
	Sundries		3 50

ESTATE OF DOMINIQUE SEIN.

1920.			
Feb. 28.	To Commission	$	2 50
	Probate duty		5 01
	Taxes, Lot 21, Bk. 27, D.L. 7		43 30
	Sundries		2 70

ESTATE OF WILLIAM I. SCOTT.

1920.			
Mar. 31.	To Commission	$	9 09
	Probate duty		4 11
	Sundries		2 20
	W. T. Scott		322 90

ESTATE OF JOHN R. B. SMITH.

1920.			
Jan. 31.	To Loss papers	$	5 00
	Sundries		1 20
	K. Smith		227 18

CR.

ESTATE OF ISABELLA M. SPEIRS.

1920.			
April 30.	By E. ½ Lot 18, W. ½ 10, Bk. 17, D.L. 465/526		$3,657 30

ESTATE OF SUNDAR SINGH (No. 2).

1920.			
Oct. 31.	By Japan and Canada Trust		$1,689 52
	Royal Bank		372 10

ESTATE OF GIOVANNI SILLANI.

1920.			
Jan. 31.	By P.O. Savings	$	352 00
	Bond		105 69

ESTATE OF DOMINIQUE SEIN.

1920.			
Feb. 28.	By Lots 1, 2, Bk. 14, D.L. 166A	$	50 00
	Refund of taxes		3 08

ESTATE OF WILLIAM I. SCOTT.

1920.			
Mar. 31.	By Workmen's Compensation Board	$	75 00

DR.

ESTATE OF ELIZABETH S. SANSBURY.

1920.			
Jan. 31.	To Commission	$	2 58
	Probate duty		2 38
	Sundries		1 20
	C. Sansbury		186 78

ESTATE OF ANGUS SMITH.

1920.			
Jan. 31.	To Commission	$	53 79
	"The World"		9 90
	Ellis & Brown		26 40
	Kearney & Co.		84 00
	Probate duty		3 18
	Sundries		4 80
	Deed and registering		10 40
	Anna Ross		208 35

ESTATE OF ROOR SINGH.

1920.			
Jan. 31.	To Commission	$	69 33
	McTaggart & Ellis		38 35
	"The World"		19 55
	Probate duty		69 32
	Sundries		2 95
	N. Singh		1,187 91

ESTATE OF NICK STOKAL.

1920.			
Jan. 31.	To "Daily Province"	$	9 90
	J. Oliver		21 90
	Commission		16 65
	Kearney & Co.		61 00
	Stewart & Willey		107 50
	Sundries		1 35

ESTATE OF CAROLINE STRANTZ.

1920.			
Jan. 31.	To Fleishman & Sugarman	$	22 70
	Commission		11 30
	"The World"		6 60
	General Hospital		42 70
	Nunn & Thomson		77 00
	Sundries		1 35
	S. Strantz		64 43

ESTATE OF BIR SINGH.

1920.			
Jan. 31.	To Kalsa D. Socuhy	$	50 00
	Coburn & Duncan		26 15
	"Daily Sun"		21 00
	Armstrong & Hotson		93 00
	General Hospital		7 40
	Commission		40 70
	Sundries		2 50

ESTATE OF ANDREW A. SELANDER.

1920.			
Jan. 31.	To Commission	$	14 01
	G. R. McQueen		34 75
	"		41 95
	Sundries		1 35
	C. A. Selander		188 38

ESTATE OF MARGARET J. STOKES.

1920.			
Mar. 31.	To General Hospital	$	20 63
	P. Warner		18 00
	E. M. Hackett		12 50
	King & Gin		44 40
	Broadway Table Supply		17 33
	Commission		57 77
	W. Edwards		10 50
	G. B. Murphy		108 00
	M. Ryckman		12 00
	G. W. Hamilton		100 00
	Taxes, Lot 39, Bk. 2, D.L. 636		8 00
	Sundries		8 82

ESTATE OF JAMES SMITH.

1920.			
April 30.	To Commission	$	6 57
	Harron Bros.		122 00
	J. Keast		2 58
	Sundries		35

ESTATE OF ERNEST ST. AMAND.

1920.			
May 31.	To "Daily Province"	$	2 75
	McTaggart & Ellis		28 05
	Harron Bros.		125 00
	General Hospital		165 35
	G. S. Gordon		150 00
	Commission		29 15
	Sundries		1 50

CR.

ESTATE OF ANGUS SMITH.

1920.			
Jan. 31.	By Bank of Montreal	$	302 83

ESTATE OF ROOR SINGH.

1920.			
Jan. 31.	By Bank of Commerce	$1,142	63
	Bond		104 98

ESTATE OF NICK STOKAL.

1920.			
Jan. 31.	By Wages	$	6 15
	J. T. Cornwall		6 75

ESTATE OF CAROLINE STRANTZ.

1920.			
Jan. 31.	By Royal Bank	$	226 08

ESTATE OF BIR SINGH.

1920.			
Jan. 31.	By Japan and Canada Trust Co.	$	105 30
	Royal Bank		708 83

ESTATE OF ANDREW A. SELANDER.

1920.			
Jan. 31.	By G. R. McQueen	$	204 25
	Bk. K, Subdiv. 3 to 7, D.L. 657		76 20

ESTATE OF MARGARET J. STOKES.

1920.			
Mar. 31.	By Bank of Montreal	$	6 63
	Cash		61
	Metropolitan Life Insurance Co.		138 00
	Bank of Commerce		559 72
June 30.	Remitted to Treasury		450 45

ESTATE OF JAMES SMITH.

1920.			
April 30.	By Cash	$	125 50
	Effects		6 00

ESTATE OF ERNEST ST. AMAND.

1920.			
May 31.	By Bank of Montreal	$	583 05

DR.

ESTATE OF JOHN SWANSON.

1920.			
June 30.	To Commission	$	3 85
	General Hospital		12 05
	Booth Logging Co.		45 75
	Sundries		35
	Dr. McKenzie		15 00

ESTATE OF ADAM SEIGIS.

1920.			
June 30.	To Hospital for Insane	$	10 00
	Commission		114 20
	D. Murchie & Son		78 50
	H. C. Major		5 00
	Fleisman & Sugarman		64 65
	"Daily Sun"		19 60
	Sundries		3 10
	Grant Hotel		178 00
	Dr. S. Blumberger		400 00
	Killam & Beck		1,024 70

ESTATE OF JESSIE STOUT.

1920.			
Oct. 31.	To G. R. Long	$	29 80

ESTATE OF MARGARET STANLEY.

1920.			
Sept. 30.	To Independent Undertakers	$	44 36
	Commission		2 33

ESTATE OF WILLIAM STOCKHOFF.

1920.			
Oct. 31.	To Davis & Co.	$	47 90
	Probate duty		15 92
	Succession duty		78 84
	Commission		23 82
	Sundries		1 50

ESTATE OF ANTON TRYKA.

1920.			
Feb. 28.	To Probate duty	$	64 99
	Sundries		1 20

ESTATE OF DANIEL C. THOMPSON.

1920.			
Feb. 28.	To Cameron & Cameron	$	154 85
	R. A. Thompson		1,823 78
	Sundries		1 20

ESTATE OF THOMAS S. TRISTRAM.

1920.			
Jan. 31.	To Commission	$	7 37
	Probate duty		1 47
	J. Oliver		23 45
	"The World"		2 40
	Dr. W. J. Ford		100 00
	Sundries		1 50
	K. Tristram		11 63

ESTATE OF ANGELO TETI.

1920.			
Jan. 31.	To Water rates	$	67 15
	Commission		121 65
	Mrs. Eusebia Teti		700 00
	G. Marius		100 00
	Insurance		57 00
	"		72 10
	Hobson & Co.		114 00
	Repairs to buildings		72 35
	Interest on mortgage		390 00
	Sterling & Co.		89 90
	Taxes on land		1,231 66

ESTATE OF N. G. TONG.

1920.			
Oct. 31.	To Senkler, Buell & Van Horne	$	32 10
	Commission		100 00
	Tai Hon Kong Bo		125 00
	"The World"		18 70
	Sundries		1 50

1920. ESTATE OF MAGNUS VIKESTAD.

May 31.	To Iven Vikestad	$	2,500 00
	Taxes on land		89 00

1920. ESTATE OF PAULA VALSOVICK.

July 31.	To Sundries	$	1 20
	Funeral		24 00
	H. O. Alexander		378 37

1920. ESTATE OF ALEXANDER WOOD.

Dec. 31.	To Probate duty	$	8 04
	Sundries		1 20
	Isabella Wood		704 05

CR.

ESTATE OF JOHN SWANSON.

1920.			
June 30.	By Cash	$	77 00

ESTATE OF ADAM SEIGIS.

1920.			
June 30.	By Cash	$	266 22
	Effects		18 15
	Mutual Life Insurance Co.		2,000 00

ESTATE OF JESSIE STOUT.

1920.			
Oct. 31.	By Lot 40, Bk. H, D.L. 393	$	40 00

ESTATE OF MARGARET STANLEY.

1920.			
Sept. 30.	By Cash and effects	$	46 69

ESTATE OF WILLIAM STOCKHOFF.

1920.			
Oct. 31.	By Bank of Commerce	$	476 32

ESTATE OF THOMAS S. TRISTRAM.

1920.			
Jan. 31.	By Cash	$	35 97
	Wages		35 40
	Bank of Commerce		76 47

ESTATE OF ANGELO TETI.

1920.			
Jan. 31.	By Payment of interest	$	10 00
	Rents		2,410 92

ESTATE OF N. G. TONG.

1920.			
Oct. 31.	By Western Casualty Co.		$2,000 00

1920. ESTATE OF PAULA VALSOVICK.

May 31.	By Remitted to Treasury	$	300 00

DR.

ESTATE OF OLAF WEDMARK.

1920.			
April 30.	To Kearney & Co.	$ 147	00
	Dr. Wilson	37	50
	Commission	15	31
	Farris & Emerson	28	45
	"The World"	6	60
	Sundries	1	50

ESTATE OF JOHN W. WILSON.

1920.			
April 30.	To Commission	$ 17	45
	"Daily Province"	13	65
	J. Oliver	22	40
	J. Bailiff	63	88
	Miner's licence	5	00
	Sundries	1	50

ESTATE OF CHARLES A. WATSON.

1920.			
May 31.	To E. R. Long	$ 26	10
	Kearney & Co.	150	50
	Commission	16	42
	"Daily Province"	9	90
	F. Simmons	34	00
	J. A. Milburn	25	38
	G. S. Gordon	53	40
	B.C. Outfitting Co.	38	73
	Sundries	2	05

ESTATE OF OLE WINOSS.

1920.			
July 31.	To Powell River Drug Co.	$ 5	00
	Hans Winoss	581	80
	Kearney & Co.	52	00
	Commission	39	70
	Probate duty	8	08
	McTaggart & Ellis	36	85
	"Daily Sun"	6	00
	Sundries		50

ESTATE OF ELIEL A. WERT.

1920.			
Sept. 30.	To "Daily Province"	$ 23	40
	Probate duty	38	42
	Succession duty	190	20
	Commission	66	18
	Shipping charges	5	00
	Dr. MacLaghlin	34	00
	Block & Bush	133	55
	J. H. Wert	806	25
	Sundries	1	75

ESTATE OF WILLIAM J. WADDILOVE.

1920.			
Dec. 31.	To Dr. Ford	$ 5	00
	Dr. Kennedy	50	00
	Dr. Pearson	25	00
	Dr. Patton	5	00
	Commission	47	22
	G. R. Long	36	70
	Sundries	1	75

CR.

ESTATE OF OLAF WEDMARK.

1920.			
April 30.	By Royal Bank	$ 306	29
	Cash	3	16

ESTATE OF JOHN W. WILSON.

1920.			
April 30.	By Cash	$ 185	10
	Royal Bank	164	03

ESTATE OF CHARLES A. WATSON.

1920.			
May 31.	By Bonds	$ 194	41
	Merchants Bank	12	57
	Cash	121	50
	Effects	31	00

ESTATE OF OLE WINOSS.

1920.			
July 31.	By Time-checks	$ 794	03

ESTATE OF ELIEL A. WERT.

1920.			
Sept. 30.	By Bank of Montreal	$1,323	75

ESTATE OF JOHN WARTON.

1920.			
Oct. 31.	By Effects	$ 25	00

ESTATE OF WILLIAM J. WADDILOVE.

1920.			
Dec. 31.	By Cash and effects	$ 29	05
	Merchants Bank	915	45

R. B. ELLIS,
Official Administrator.

COUNTY COURT, DISTRICT OF VICTORIA.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF MARGARET ALSTON.

1920.			
May 25.	To Commission	$ 13	53
June 4.	"Colonist," advertising	5	60
	Bodwell & Lawson	37	80
July 31.	Commission	10	24
Nov. 30.	Bodwell & Lawson	5	00

CR.

ESTATE OF MARGARET ALSTON.

1920.			
Feb. 25.	By Account share sale of Lots 6, 7, Bk. O, Map 274	$ 270	64
July 6.	Balance, ditto	204	81

DR.

ESTATE OF ARCHIBALD MACLAGAN ANDREWS.

1920.			
Aug. 31.	To Commission	$	18 50
Sept. 2.	"Colonist"		2 70
Sept. 30.	Commission		14 75
	Death certificate and postage		2 00
Oct. 7.	White & Martin		53 85
Oct. 31.	Commission		100 90
	Canadian Bank of Commerce, funeral and hospital		440 00
Nov. 3.	Drs. Ridewood, Jones & Robertson		10 00
	Dr. R. L. Fraser		50 00
	Dr. A. B. Hudson		35 00
	Dr. G. Hall		300 00
	Pacific Club		81 15
	Succession duty		313 64
Dec. 31.	Commission		67 90

ESTATE OF ALBERT E. ARMBRUSTER.

1920.			
July 20.	To Commission	$	40 31
	"Colonist"		4 80
	White & Martin		41 85
	Searching property, Land Registry Office		1 00

ESTATE OF MIKE BORICK.

1920.			
Sept. 30.	To Commission	$	1 00
Oct. 4.	City of Victoria, funeral expenses		18 85

ESTATE OF PETER BRAZIL.

1920.			
July 13.	To McIntosh, Meredith & Kennedy	$	12 00
	F. J. Brassil		164 62
	A. J. Brassil		164 62
	P. Brassil		164 62

ESTATE OF DAVID CLARKE.

1920.			
July 2.	To Commission	$	1 34
July 5.	White & Martin		7 90

ESTATE OF DAVID CUNNINGHAM.

1920.			
Aug. 31.	To Commission	$	4 05
Oct. 13.	Bodwell & Lawson		13 40
Oct. 31.	Commission		1 65

1920.	ESTATE OF E. P. COLLEY.		
Jan. 22.	To W. H. Langley	$	5 00
July 2.	Commission		1 25
Sept. 16.	Part taxes, Lots 1, 2, Map 882		7 98

ESTATE OF JOSEPH ARTHUR EARLE CHANDLER.

1920.			
Jan. 7.	To R. D. Chandler, on account claim	$	250 00
Aug. 14.	W. H. Smith & Sons		21 50
Aug. 26.	R. D. Chandler, on account claim		782 00
Dec. 22.	White & Martin		48 68

1920.	ESTATE OF JOHN CURRIE.		
Jan. 12.	To Commission	$	68 55
Jan. 16.	Findlay, Durham & Brodie, funeral		131 00
	Commission		5 00
	Probate duty		5 59
	"Colonist"		3 00
Jan. 17.	Dr. R. L. Fraser		150 00
Jan. 20.	Barnard, Robertson, Heisterman & Tait		25 00
	Jubilee Hospital		102 10
May 25.	Commission		5 15
Nov. 30.	"		94

1920.	ESTATE OF JAMES DENNY.		
July 20.	To Commission	$	3 25
	Langley & Moore		35 09
July 31.	Commission		2 88
Aug. 14.	"Times"		3 50
Aug. 26.	Langley & Moore		3 00
Aug. 31.	Commission		9 64
Sept. 20.	Hicks & Sons		25 88
	Mrs. Lucy Smith		20 00
	Central Drug Store		2 64
	New Method Laundry		9 40
	Jameson & Willis		143 00

CR.

ESTATE OF ARCHIBALD MACLAGAN ANDREWS.

1920.			
Aug. 28.	By Cash on hand	$	43 81
Aug. 31.	Canadian Bank of Commerce		326 36
Sept. 15.	Interest, Ames Holden Tire Co.		58 27
Sept. 18.	Sale of personal effects		236 75
Oct. 14.	Sun Life Assurance Co.		1,000 00
Oct. 22.	Canadian Bank of Commerce, pension		1,000 00
Oct. 26.	Interest, French bonds		17 68
Dec. 3.	Sale of French bonds and Whalen Pulp stock		612 00
Dec. 29.	Sale of Robt. Simpson stock		745 85

ESTATE OF ALBERT E. ARMBRUSTER.

1920.			
July 20.	By Mrs. E. G. Humber, balance of agreement for sale of Lots 1, 2, 3, Map 987	$	806 30

ESTATE OF MIKE BORICK.

1920.			
Sept. 14.	By City Police, cash	$	19 85

ESTATE OF DAVID CLARKE.

1920.			
June 15.	By Royal Bank	$	26 68
	Provincial Police		05

ESTATE OF DAVID CUNNINGHAM.

1920.			
Aug. 16.	By Charter Lumber Co., wages	$	81 02
Oct. 4.	Sale of jewellery		20 00
Oct. 7.	Sale of personal effects		13 20

1920.	ESTATE OF E. P. COLLEY.		
June 1.	By R. S. Day, dividend, Esquimalt Syndicate	$	25 00

1920.	ESTATE OF JOHN CURRIE.		
Feb. 17.	By Assistant Receiver-General	$	103 00
Nov. 13.	Sale of personal effects		18 90

1920.	ESTATE OF JAMES DENNY.		
July 9.	By Canadian Bank of Commerce	$	64 99
July 30.	Sale of furniture		57 70
Aug. 31.	" personal effects		192 77

DR.

ESTATE OF JOHN OLIVER DONAHOO.

1920.			
July 31.	To Commission	$ 102	44
	Succession and probate duty	181	92
Aug. 19.	J. Sheppard, repairs, 3070 Albany Street	20	25
Aug. 31.	Commission	3	16
	Sands Funeral Co.	175	00
Sept. 2.	"Times"	31	50
Sept. 11.	A. J. Patton	90	66
Sept. 30.	Commission	1	40
	Land Registry Office, search and postage	2	00
Oct. 31.	Commission		86
Nov. 3.	Taxes, 3070 Albany Street..	30	75
Nov. 20.	K. S. Patrick, kalsomining, 3070 Albany Street	28	00
Nov. 30.	Commission	1	46
Dec. 31.	"	47	92
	Registering two release mortgages, copy of letters of administration and declaration	3	00

ESTATE OF ELIZABETH EARLE.

1920.			
Jan. 12.	To Commission	$ 1	70
Feb. 13.	Vancouver City, water	4	20
May 25.	Commission	2	57
June 1.	Insurance, 1682 Third Avenue West	23	28
July 2.	Commission	1	71
July 6.	Valuating Vancouver property	10	00
July 20.	Commission	100	73
Sept. 28.	Yates & Jay	10	00
	W. A. Earle	723	21
	E. M. Earle	723	21
	E. M. Earle	723	21

ESTATE OF JOHN ERSKINE.

1920.			
Feb. 2.	To Commission	$ 5	08

ESTATE OF JOHN ECHOLN.

1920.			
Oct. 31.	To Commission	$ 18	80
Nov. 11.	Probate duty	7	44
Nov. 26.	Crease & Crease	31	65
Nov. 30.	Commission		24
Dec. 7.	"Times"	7	00
Dec. 15.	Lady Minto Gulf Islands Hospital	85	00
	Dr. E. M. Sutherland	89	00
	W. C. Wilson	12	00
	Mouat Bros. Co., Ltd., funeral expenses	71	90

ESTATE OF BARTHOLOMEW EDMUNDS.

1920.			
Dec. 31.	To Commission	$ 2	50

ESTATE OF EDWARD FISHER.

1920.			
Jan. 15.	To "Times"	$ 9	85
	Probate duty	2	96
Jan. 12.	Commission	16	14
Feb. 2.	"	8	25
June 18.	James Bay Athletic Association	18	00
July 2.	Commission	12	83

ESTATE OF QUONG HING FONG.

1920.			
Sept. 30.	To Commission	$ 0	26

ESTATE OF BLANCHE F. C. GRANCINI.

1920.			
Sept. 30.	To Searching property, Land Registry Office	$ 1	00

ESTATE OF WILLIAM GIBSON.

1920.			
July 20.	To Commission	$ 16	41
July 26.	White & Martin	27	45
Aug. 2.	"Colonist"	3	00

ESTATE OF CHARLES A. HARRISON.

1920.			
Sept. 11.	To Taxes, 1920, pt. Lot 1, Map 255A	$ 21	16

CR.

ESTATE OF JOHN OLIVER DONAHOO.

1920.			
July 30.	By Merchants Bank	$2,048	80
Aug. 7.	B.C. Land & Investment	13	16
Aug. 16.	S. Thomson	50	00
Sept. 1.	Rents, 3070 Albany Street..	17	10
Sept. 18.	First National Bank	10	95
Oct. 1.	Rents, 3070 Albany Street..	17	10
Nov. 1.	" " ..	29	45
Dec. 1.	" " ..	20	45
Dec. 11.	Sale, 3070 Albany Street, less mortgage	938	10

ESTATE OF ELIZABETH EARLE.

1920.			
Mar. 31.	By Rents, Vancouver property..	$ 51	30
June 5.	" " ..	34	20
July 7.	" " ..	17	10
July 13.	Sale, 1682 Third Avenue West, Vancouver	1,997	50

ESTATE OF JOHN ERSKINE.

1920.			
Jan. 14.	By Bank of Montreal	$ 101	76

ESTATE OF JOHN ECHOLN.

1920.			
Oct. 23.	By Provincial Police, cash	$ 375	80
Nov. 12.	Sale of personal effects	4	95

ESTATE OF BARTHOLOMEW EDMUNDS.

1920.			
Dec. 21.	By City Police, cash	$ 50	00

ESTATE OF EDWARD FISHER.

1920.			
Jan. 20.	By Sale of launch	$ 165	00
June 2.	Board of Trade, wages	142	60
June 28.	Board of Trade, sale of personal effects	114	03

ESTATE OF QUONG HING FONG.

1920.			
Sept. 30.	By City Police, cash	$ 5	24

ESTATE OF WILLIAM GIBSON.

1920.			
July 20.	By Sale agreement, Victory bonds	$ 328	20

DR.

ESTATE OF CHRISTIAN HOLT.

1920.			
July 2.	To Commission	$ 2	50
July 5.	"Times"	3	50
July 13.	Beckwith, Clay & Norris	20	95

ESTATE OF CARL HOERNIG.

1920.			
June 1.	To Barnard, Robertson, Heisterman & Tait	$ 25	00
July 27.	J. S. Brandon, solicitor for Percy Hoernig	608	63

ESTATE OF CHARLES INGLIS.

1920.			
Sept. 30.	To Commission	$ 4	05
Oct. 31.	"	11	70
	"Colonist"	2	70
	Miss M. L. Ringland	22	61
Oct. 19.	D. Slimming, funeral, doctor, and hospital	140	48

ESTATE OF JANE KING.

1920.			
June 1.	To Commission	$ 189	00
June 3.	Courtney & Elliott	33	25
June 11.	" "	3	50
	Postage	1	50
	Charles King	2,031	78
Aug. 2.	Courtney & Elliott	44	75
	Official Guardian, for F. M. King	4,018	82

ESTATE OF OLIVER JAMES KNIGHTS.

1920.			
Sept. 11.	To Taxes, 1920, Lot 10, Map 1893	$ 3	00
Sept. 30.	Water tax, 1920	2	50
Dec. 22.	Yates & Jay	105	50

ESTATE OF MARY ALICE KING.

1920.			
June 18.	To James King	$ 58	49
	Violet Rose	39	00

ESTATE OF LUCY LAWRENCE.

1920.			
Feb. 4.	To M. E. Duncan, claim	$ 4	00
Feb. 2.	Commission	2	10
	Jubilee Hospital	28	50
May 25.	Commission	16	91
June 1.	McIntosh, Meredith & Kennedy	40	31
June 4.	"Colonist"	5	60
June 5.	B.C. Funeral Co.	125	00
July 2.	Commission		93
Aug. 31.	"	3	12

ESTATE OF ELIZA MARSHALL.

1920.			
June 18.	To Mrs. Ruth Kuester	$ 130	00

ESTATE OF A. J. MOFFATT.

1920.			
Sept. 16.	To Bodwell & Lawson	$ 15	25
	Probate and succession duties	117	63
	Taxes, 1920, Lot 49	13	44
	E. W. Friend	281	70

ESTATE OF JOHN MARTIN.

1920.			
Aug. 31.	To Commission	$ 7	40
Oct. 31.	"	1	11
	Yates & Jay	28	35
Nov. 11.	R. H. Whidden	12	00
	"Times"	3	50

ESTATE OF JOHN JOSEPH MORAN.

1920.			
Jan. 13.	To Funeral expenses	$ 146	00
Jan. 12.	Commission	3	70
Jan. 16.	McIntosh, Meredith & Kennedy	37	23
Jan. 17.	"Times"	4	50
Feb. 2.	Commission	15	27
May 25.	"	10	05
June 1.	McIntosh, Meredith & Kennedy	30	55
June 5.	Express, personal effects	5	00
	Mrs. B. Moran	328	03

CR.

ESTATE OF CHRISTIAN HOLT.

1920.			
June 19.	By Quit-claim, Lot 9, Map 420	$ 50	00

ESTATE OF CHARLES INGLIS.

1920.			
Sept. 21.	By Provincial Police, cash	$ 81	00
Oct. 7.	Sale of personal effects	134	12
Oct. 23.	Canadian Bank of Commerce	99	85

ESTATE OF JANE KING.

1920.			
June 1.	By Part estate of Arthur Camp	$ 3,780	00

ESTATE OF LUCY LAWRENCE.

1920.			
Jan. 26.	By S.C. Re-establishment	$ 42	00
Feb. 9.	"	3	22
Feb. 23.	Canadian Bank of Commerce	335	00
June 11.	S.C. Re-establishment	18	50
Aug. 26.	Sale of personal effects	62	45

ESTATE OF JOHN MARTIN.

1920.			
Aug. 11.	By Harbour Marine Co., wages	$ 49	43
	Provincial Police, cash	98	58
Oct. 11.	Pension Board	7	20
Oct. 19.	Sale of personal effects	15	00

ESTATE OF JOHN JOSEPH MORAN.

1920.			
Jan. 2.	By Royal Bank	$ 305	51
Feb. 9.	Sale of Victory bonds	201	00

DR.

ESTATE OF ANNIE MCKENZIE.

1920.				
Jan.	12.	To Insurance, Ontario Street..	$ 30	00
Feb.	10.	Commission	151	30
Feb.	22.	T. M. Miller	151	30
May	21.	J. P. Wallis, tax certificate, Lot 17	373	03
		A. Lee, tax certificate, 1129 McKenzie Avenue	760	31
May	25.	Commission	2	07
June	1.	Insurance, McKenzie Avenue	26	40
June	18.	McPherson & Fullerton Bros., valuating property	33	00
June	23.	Taxes, 1919, Lot 17	50	01
		Taxes, 1919, Lot 13	49	08
		Local improvement, 1919 and 1920, Lot 13	97	82
July	2.	Commission	93	55
July	6.	Insurance, Collinson Street.	5	00
July	10.	Quit-claim, pt. Lot 6, Map 1207	10	00
July	26.	T. M. Miller	220	80
July	31.	Commission	1	84
Aug.	19.	Repairs, 236 Gorge Road ..	20	50
Aug.	31.	Commission	1	38
Sept.	23.	Insurance, 236 Gorge Road..	42	50
Sept.	30.	Commission	6	95
Oct.	14.	Taxes, 1916, Lot 1200 and pt. 1199, Lots 6, 7, 8, Map 1247; Lots 7, 8, Map 835	620	71
Oct.	31.	Commission	5	19
Nov.	30.	"	15	48
Dec.	31.	"	26	86

ESTATE OF THOS. MCCORMICK.

1920.				
Sept.	11.	To Taxes, 1920, Lot 16, Map 1579	$ 2	80

ESTATE OF JOHN GREGOR MCLEAN.

1920.				
Sept.	30.	To Commission	$ 5	33
Oct.	31.	"	60	05
		Land Registry, search of property	1	00
		"Colonist"	2	80
Nov.	3.	B.C. Funeral Co.	52	50
Nov.	26.	B.C. Electric		69
		Bethune Grocery	19	86
		"Times"	1	65
		W. T. McNeil	17	18
		Cedar Hill Dairy	4	00
		J. M. Jordan	63	50
		A. S. Goodeve & Co.	30	80
Nov.	30.	Registering letters of administration	1	00
		N. W. Whittaker	50	20
Dec.	7.	L. A. Bean	35	00

ESTATE OF ALBIN NICHOLSON.

1920.				
Oct.	31.	To Commission	$ 46	20
		A. J. Patton	47	90
		Probate duty	9	08
Nov.	11.	"Times"	3	50

ESTATE OF THOMAS PAQUETTE.

1920.				
Oct.	31.	To Commission	$ 4	64
		City of Victoria, funeral ..	20	00
		Rent, Oriental Alley	25	00
Nov.	3.	Dr. La Bau	5	00
		St. Joseph's Hospital	38	13

ESTATE OF ANN ELIZABETH POWELL.

1920.				
Sept.	30.	To Commission	$ 6	40
Nov.	30.	"	26	55
		Death certificate		75
Dec.	7.	"Times"	7	00

CR.

ESTATE OF ANNIE MCKENZIE.

1920.				
Jan.	17.	By Cusack, mortgage	$3,025	90
Feb.	26.	Brett & Kerr, rents	41	35
		Seymour, cheque returned ..	55	02
June	3.	Rents	118	75
June	7.	Interest, Chadwick mortgage	16	65
June	8.	Oliphant, mortgage	1,038	00
		D. A. Cameron	329	30
June	14.	Rent, Collison Street	268	38
June	28.	Quit-claim, Lot 11	100	00
July	1.	Rents	28	50
		Interest, Chadwick mortgage	8	30
Aug.	2.	Rents	27	55
Sept.	1.	"	138	90
Oct.	1.	"	74	85
Oct.	12.	Rent, Lot 17	10	00
Oct.	19.	Mrs. Pinch, proportion of taxes, Lot 10	19	00
Nov.	1.	Rents	52	25
Nov.	8.	D. A. Cameron	257	37
Dec.	1.	Rents	28	50
Dec.	9.	Chadwick mortgage	508	75

ESTATE OF JOHN GREGOR MCLEAN.

1920.				
Sept.	15.	By Provincial Police, cash	$ 10	85
		" " wages ...	39	63
Sept.	18.	Falls Logging Co., wages...	46	01
Sept.	22.	Sale of personal effects ...	10	25
Sept.	19.	Sale of Lots 4, 5, less mortgage	892	05
		Sale of furniture and chickens	297	78
		Refund, fire insurance	10	00
Sept.	27.	Royal Bank	1	13

ESTATE OF ALBIN NICHOLSON.

1920.				
Oct.	15.	By Merchants Bank	$ 727	75
Oct.	22.	Sale of Victory bonds	196	30

ESTATE OF THOMAS PAQUETTE.

1920.				
Oct.	16.	By Sale of house-moving apparatus	$ 60	00
Oct.	20.	Sale of personal effects	7	50
		Cash	25	27

ESTATE OF ANN ELIZABETH POWELL.

1920.				
Sept.	3.	By Cash	$ 128	00
Nov.	23.	Merchants Bank	145	00
Nov.	25.	Sale of Victory bonds	386	00

DR.

ESTATE OF EMMA RALPH.

1920.			
Jan. 15.	To Commission	$ 0	75
May 25.	"	10	92
June 9.	Taxes, Lots 17, 18	121	96
July 2.	Commission	2	14
July 31.	"	3	08
Aug. 19.	Repairs, Pleasant Ave.	70	55
Aug. 31.	Commission	8	32
	Repairs, furnace and gutter-pipes, Pleasant Ave.	100	00
	Crease & Crease	49	50
	" " for heirs	2,900	00
Sept. 3.	Repairs, Pleasant Ave.	4	00
Sept. 30.	Commission	143	21
	Land Registry, search of property	2	25
Oct. 4.	Taxes, pt. Bk. 76	20	63
Oct. 31.	Commission	19	00
Nov. 11.	Crease & Crease, for heirs	3,000	00
Nov. 30.	Registering copy of letters of administration		50

ESTATE OF C. STAFFORD.

1920.			
June 5.	To B. H. Stafford	$ 70	00
July 2.	Commission		76
July 30.	"		99
Sept. 11.	Taxes, 1920, N. ½ Lot 1	9	38
Sept. 30.	Commission	1	33
Dec. 31.	"		99

ESTATE OF RICHARD SHORE.

1920.			
Jan. 12.	To Commission	$ 0	50
June 15.	1919 taxes, Lot 4, Map 317A	28	91
July 2.	Commission	6	98
Sept. 3.	Yates & Jay	144	52
Sept. 8.	W. T. Shore	262	41
Sept. 30.	Commission	3	50

ESTATE OF W. P. SMITH.

1920.			
Feb. 10.	To A. J. Patton	$ 80	75
Feb. 2.	Commission	4	00
May 25.	"		95
June 16.	Mrs. P. Smith	407	25

ESTATE OF BHAGWA SINGH.

1920.			
Sept. 30.	To Commission	$	05

ESTATE OF GERARD STANKEN.

1920.			
Oct. 31.	To Commission	$ 1	13
Nov. 30.	"		38
Dec. 7.	Aikman & Shaw	21	70
Dec. 31.	Commission		38

ESTATE OF PETER SCHOUVELLER.

1920.			
Sept. 30.	To Commission	$ 1	20
Oct. 4.	Victoria City, funeral	22	90

ESTATE OF HONG SOON.

1920.			
May 25.	To Commission	$ 0	70

ESTATE OF FRANCIS LEE TUCKFIELD.

1920.			
Aug. 31.	To Commission	$ 1	33
	City of Victoria, funeral	20	00
Sept. 3.	Erecting head-stone	5	11

ESTATE OF LYMAN S. WILSON.

1920.			
July 2.	To Commission	$ 19	50
July 5.	Probate duty	14	33
	Sands Funeral Co.	96	50
	Jubilee Hospital	97	40
	R. M. Newcombe	2	06
July 6.	Langley & Moore	29	20
July 20.	"Colonist"	2	40

1920. ESTATE OF GEORGE WATSON.

July 2.	To Commission	$ 0	81
July 31.	"		08

1920. ESTATE OF NICHOLAS ZAFIRIS.

July 27.	To V. Paul	$ 263	99

CR.

ESTATE OF EMMA RALPH.

1920.			
Feb. 4.	By Wise & Co., rents	$ 18	50
Feb. 13.	Crease & Crease, rents	100	00
Mar. 17.	" "	100	00
June 2.	" "	42	75
July 1.	" "	61	75
Aug. 2.	" "	166	40
Sept. 1.	" "	14	25
Sept. 13.	Sale of Lots 17, 18	2,850	00
Oct. 1.	" pt. Bk. 76.	380	00

ESTATE OF C. STAFFORD.

1920.			
June 2.	By Rents	$ 15	25
July 1.	"	19	95
Sept. 1.	"	26	60
Dec. 1.	"	19	95

ESTATE OF RICHARD SHORE.

1920.			
June 2.	By Rents	$ 19	00
June 11.	"	120	60
Sept. 3.	Yates & Jay, Boorman note	69	90

ESTATE OF W. P. SMITH.

1920.			
Jan. 13.	By A. S. Barton, rents	$ 76	00
Feb. 2.	" "	19	00

ESTATE OF BHAGWA SINGH.

1920.			
Sept. 30.	By City Police, cash	$ 1	04

ESTATE OF GERARD STANKEN.

1920.			
Oct. 1.	By Payment, house-boat	$ 22	50
Nov. 1.	" "	7	60
Dec. 1.	" "	7	60

ESTATE OF PETER SCHOUVELLER.

1920.			
Sept. 22.	By Sale of personal effects	$ 24	10

ESTATE OF HONG SOON.

1920.			
Feb. 3.	By J. O. Cameron, wages	$ 14	00

ESTATE OF FRANCIS LEE TUCKFIELD.

1920.			
Aug. 2.	By City Police, cash	$ 6	41
	Sale of personal effects	20	03

ESTATE OF LYMAN S. WILSON.

1920.			
June 8.	By Royal Bank	$ 389	93

1920. ESTATE OF GEORGE WATSON.

June 19.	By Whaling Co., wages	$ 16	27
July 2.	Sale of personal effects	1	75

R. L. COX,
Official Administrator.

YALE AND LILLOOET ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1920, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.

ESTATE OF LIM SOW.

1920.			
Mar. 12.	To Nicola Pine Mills, Ltd.	$	73 15

ESTATE OF STEPHEN RADICH.

1920.			
Feb. 5.	To Consul-General of Serbs	$	78 95

ESTATE OF TAYLOR HAYDEN.

1920.			
April 9.	To William C. Parker	$	24 30
	R. E. Underwood		384 40

ESTATE OF ARTHUR GORDON JARVIS.

1920.			
Mar. 29.	To I. Leihman	$	85 00

ESTATE OF JOHN FELIX.

1920.			
April 30.	To W. C. Parker	$	39 85
May 31.	M. L. Grimmett		18 07
June 4.	A. F. Forest		25 90
	G.W.V.A., Hope Branch ...		121 75

ESTATE OF WILLIAM HENRY HARMON.

1920.			
May 31.	To M. L. Grimmett	$	18 96
	W. C. Parker		52 50
June 30.	Independent Undertakers ..		108 00

ESTATE OF SAMUEL DALLAS HARMON.

1920.			
May 31.	To W. C. Parker	$	58 90
	J. W. Ellis		7 00
	M. L. Grimmett		68 73
	Exchange on draft		3 50
June 30.	Independent Undertakers ...		105 00
	W. C. Parker		47 50
July 21.	Vancouver General Hospital		484 76
	Nicola Valley General Hospital		220 40
	Dr. Curtiss		200 00
	Dr. J. J. Gillis		20 00
	Thomas Dobie		40 00
	A. Jackson		27 40

ESTATE OF E. H. HAROLD.

1920.			
Oct. 1.	To M. L. Grimmett	$	109 75
Oct. 30.	W. C. Parker		80 20
	Christopher Harold		1,500 00
Nov. 13.	Nicola Valley General Hospital		30 50

1920. ESTATE OF HENRY A. PETERSON.

Aug. 13.	To Exchange on draft	$	0 79
	W. J. Barwick		228 50
Sept. 30.	W. C. Parker		59 35
	M. L. Grimmett		41 90
	Exchange on draft		1 35
	A. Olson		15 00
	P. Edmark		14 75
	J. Edmark		17 00
	Fred Deccer		25 00
	M. Hirlok		55 00
Oct. 30.	M. L. Grimmett		7 90
Nov. 8.	J. L. Dunlop		21 55
	Armstrong's Depart. Store, Ltd.		279 99
	City of Merritt		5 90
	Schmocks Meat Market		44 15
	E. R. Williams		9 00
	Mrs. E. A. Collett		5 75
	Government Telegraph Service		2 00
	Nicola Valley Garage		14 55
	Merritt Mercantile Company		104 00
	M. M. Grimmett		15 00
	J. F. Jerread		19 82

Cr.

ESTATE OF JOHN FELIX.

1920.			
April 1.	By W. Greenwood		24 00
April 5.	C.N.R., pay-cheques		254 70
May 6.	Sale of watch		25 00
June 18.	W. Greenwood		12 00

ESTATE OF WILLIAM HENRY HARMON.

1920.			
April 6.	By Cash, Vancouver General Hospital	$	4 81
May 3.	Kettle Valley Railway		6 40
May 5.	Bank of Toronto, less exchange		256 18
May 6.	Simpson and Cranna		3 50
May 8.	J. T. Willgoose		6 00
Aug. 23.	Mrs. E. Cameron		5 00

ESTATE OF SAMUEL DALLAS HARMON.

1920.			
May 5.	By Bank of Toronto	$	3 07
May 15.	L. W. Ingram		35 00
May 26.	M. L. Grimmett		165 00
	Sophia Peterson		375 00
	L. Thompson		800 00
July 2.	L. W. Ingram		15 00
Oct. 22.	Postal Department		9 95
Nov. 30.	L. W. Ingram		10 00

ESTATE OF E. H. HAROLD.

1920.			
Aug. 24.	By J. A. Guichon		$1,755 00

1920. ESTATE OF HENRY A. PETERSON.

Aug. 11.	By Bank of Montreal	$	300 11
Sept. 1.	Bank of Toronto		3 63
Sept. 22.	Sale of goods		384 51
Sept. 23.	E. Gavelin		150 00
Oct. 7.	„		150 00

DR.

ESTATE OF LEE CHONG.

1920.			
Sept. 30.	To M. L. Grimmett	$	4 95
Oct. 30.	W. C. Parker		13 40
	Chinese Consul, Vancouver		75 91

ESTATE OF THOMAS DOMINICK.

1920.			
Dec. 18.	To M. L. Grimmett	$	55 32
	W. C. Parker		52 20

ESTATE OF WILLIAM EDWARDS.

1920.			
Dec. 18.	To M. L. Grimmett	$	5 00
	W. C. Parker		13 70
	N. J. Barwick		81 36

CR.

ESTATE OF LEE CHONG.

1920.			
July 25.	By Kettle Valley Railway	$	94 26

ESTATE OF THOMAS DOMINICK.

1920.			
Oct. 12.	By A. Strang	$	50 45
Dec. 13.	Canadian Bank of Commerce		506 25

ESTATE OF WILLIAM EDWARDS.

1920.			
Dec. 8.	By Bank of Toronto	$	100 06

M. L. GRIMMETT,
Official Administrator.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

ESTIMATES

OF THE

REVENUE AND EXPENDITURE

OF

BRITISH COLUMBIA

FOR THE

FISCAL YEAR ENDING 31st MARCH

1922

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

ESTIMATED REVENUE

FOR THE

FISCAL YEAR ENDING 31ST MARCH, 1922

Estimated for Fiscal Year 1920–21.	SERVICE.		Fiscal Year, 1921–22.
	CURRENT ACCOUNT.		
	DEPARTMENT OF AGRICULTURE:		
$ 22,000 00	Horticultural Inspection Fees and Licences	$ 28,000 00	
23,000 00	Seed-grain Advances Refunds	10,500 00	
.....	Miscellaneous	2,500 00	
$ 45,000 00			$ 41,000 00
	DEPARTMENT OF THE ATTORNEY-GENERAL:		
$ 45,000 00	Court Fees and Fines	$ 50,000 00	
1,500 00	Dog Licences	1,500 00	
195,000 00	"Game Act"—Fees and Licences	200,000 00	
80,000 00	"Insurance Act"—Licences, Taxes, and Fees	85,000 00	
55,000 00	Joint-stock Companies, etc.—Registration Fees	75,000 00	
10,000 00	Keep of Prisoners—Reimbursement	20,000 00	
350,000 00	Land Registry Fees	375,000 00	
75,000 00	Law Stamps	90,000 00	
650,000 00	"Motor-vehicle Act"—Fees	750,000 00	
15,000 00	"Moving Pictures Act"—Fees	17,500 00	
25,000 00	"Government Liquor Act"—Profit on Liquor sold, etc.	2,500,000 00	
25,000 00	Sheriffs' Fees	20,000 00	
21,000 00	Trade Licences	25,000 00	
5,000 00	Miscellaneous Receipts	30,000 00	
$ 1,552,500 00			4,239,000 00
	DEPARTMENT OF EDUCATION:		
.....	Examinations Fees	$ 4,000 00	
$ 2,500 00	Teachers' Examinations and Certificates	2,500 00	
	Technical School:		
	Rent	$12,000 00	
	Dominion Grant	54,000 00	
42,000 00		66,000 00	
1,000 00	Text-books sold	1,500 00	
$ 45,500 00			74,000 00
	DEPARTMENT OF FINANCE:		
	Dominion of Canada:		
$ 29,151 06	Annual Interest	$ 29,151 06	
180,000 00	Annual Subsidy	180,000 00	
$ 209,151 06	*Carried forward*	$ 209,151 06	$4,354,000 00

Estimated for Fiscal Year 1920–21.	SERVICE.		Fiscal Year. 1921–22.
	CURRENT ACCOUNT—*Continued.*		
$ 209,151 06	*Brought forward*	$ 209,151 06	$4,354,000 00
	DEPARTMENT OF FINANCE—*Continued.*		
	Dominion of Canada—*Continued.*		
313,984 00	Annual Grant *per Capita*	313,984 00	
100,000 00	Annual Grant for Lands conveyed	100,000 00	
$ 623,135 06		623,135 06	
280,000 00	Amusements Tickets Tax	350,000 00	
185,000 00	Coal and Coke Tax	220,000 00	
2,000,000 00	Income Tax	2,000,000 00	
	Interest:		
19,080 07	"Dyking Assessments Adjustment Act"	19,080 07	
260,000 00	Sinking Fund Investments	305,000 00	
450,000 00	Miscellaneous	300,000 00	
	Land Taxes:		
1,115,000 00	Real Property	1,050,000 00	
980,000 00	Wild Land, Coal and Timber Lands	975,000 00	
150,000 00	Mineral Tax	135,000 00	
800,000 00	Personal Property Tax	860,000 00	
50,000 00	Poll Tax	235,000 00	
75,000 00	Probate Fees	75,000 00	
	Rents:		
37,800 00	B.C. House, London, England	51,200 00	
200 00	Miscellaneous Rents	200 00	
5,000 00	Revenue Service Refunds	6,000 00	
175,000 00	Rural District School Taxes	220,000 00	
325,000 00	Succession Duties	700,000 00	
50,000 00	Unworked Crown-granted Mineral Claims—Taxes	50,000 00	
53,500 00	Miscellaneous Receipts	200,000 00	
56,000 00	Trust Deposits reverted to Crown	.....	
$ 7,689,715 13			8,374,615 13
	DEPARTMENT OF FISHERIES:		
$ 36,000 00	Fishing and Cannery Licences, etc.		30,000 00
	DEPARTMENT OF LABOUR:		
$ 30,000 00	Dominion of Canada, Subvention		35,000 00
	DEPARTMENT OF LANDS:		
$ 19,000 00	Grazing Rentals, Leases, and Fees	$ 20,000 00	
65,000 00	Land Revenues—Sundry	100,000 00	
150,000 00	Land Sales	550,000 00	
10,000 00	Survey Fees and Sale of Maps	11,000 00	
65,000 00	Timber Leases	65,000 00	
2,200,000 00	Timber Licences	1,350,000 00	
350,000 00	Timber Sales	300,000 00	
1,075,000 00	Timber Royalties	950,000 00	
60,000 00	Water Rentals and Recording Fees	60,000 00	
15,000 00	Miscellaneous Receipts	10,000 00	
$ 4,009,000 00			3,416,000 00
	Carried forward		$16,209,615 13

Estimated for Fiscal Year 1920-21.	SERVICE.		Fiscal Year, 1921–22.
	CURRENT ACCOUNT—*Continued.*		
	Brought forward		$16,209,615 13
	LEGISLATION:		
$ 2,000 00	Private Bills Fees		2,000 00
	DEPARTMENT OF MINES:		
$ 1,000 00	Bureau of Mines	$ 1,000 00	
60,000 00	Free Miners' Certificates	61,000 00	
1,000 00	Miners' Examinations and Certificates	1,000 00	
100,000 00	Mining Receipts, General	100,000 00	
$ 162,000 00			163,000 00
	DEPARTMENT OF THE PROVINCIAL SECRETARY:		
$ 15,000 00	Colony Farm	$ 15,000 00	
14,480 00	Dominion Grant, Venereal Disease	14,480 00	
175,000 00	King's Printer	225,000 00	
14,000 00	Marriage Licences	14,000 00	
80,000 00	Mental Hospitals	90,000 00	
3,500 00	Notaries Public and Commissioners' Fees	3,000 00	
1,300 00	Provincial Home, Kamloops	2,000 00	
.....	Tranquille Sanatorium	155,000 00	
3,000 00	Vital Statistics, etc.	3,000 00	
350 00	Miscellaneous Receipts	1,000 00	
$ 306,630 00			522,480 00
	DEPARTMENT OF PUBLIC WORKS:		
$ 27,000 00	Boiler Inspections and Examinations Fees	$ 32,000 00	
5,500 00	Electrical Energy Inspection	4,500 00	
20,000 00	Ferry Tolls	18,000 00	
5,000 00	Government Property sold	7,500 00	
4,000 00	Wharfage and Dock Dues	4,000 00	
400 00	Miscellaneous Receipts	500 00	
$ 61,900 00			66,500 00
	DEPARTMENT OF RAILWAYS:		
.....	Inspection Fees	$ 4,000 00	
$ 36,000 00	New Westminster Bridge-tolls	40,000 00	
2,000 00	Miscellaneous Receipts	3,000 00	
$ 38,000 00			47,000 00
$13,978,245 13	Total Estimated Revenue for fiscal year 1921–22		$17,010,595 13

ESTIMATED EXPENDITURE

FOR THE

FISCAL YEAR ENDING 31ST MARCH, 1922

SUMMARY

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.	Page.		Fiscal Year, 1921–22.
			CURRENT ACCOUNT.			
$ 1,838,378 08	$ 1,838,378 08	1.	PUBLIC DEBT	9–10		$2,829,633 08
$ 109,170 00	$ 109,170 00	2.	LEGISLATION	10		109,870 00
$ 13,880 00	$ 13,880 00	3.	PREMIER'S OFFICE	11		13,680 00
			DEPARTMENT OF AGRICULTURE:			
$ 11,380 00	$ 11,380 00	4.	Minister's Office	11	$ 11,440 00	
35,658 00	35,658 00	5.	General Office	11–12	34,996 00	
101,096 00	101,840 00	6–11.	Horticultural Branch	12–14	93,540 00	
62,632 00	64,632 00	12–16.	Live Stock Branch	14–16	73,462 00	
4,720 00	4,720 00	17.	Statistics	16	4,720 00	
17,200 00	17,380 00	18.	District Agriculturists, etc.	16	16,270 00	
1,500 00	1,680 00	19.	Workshop and Shipping Office	16	3,200 00	
108,550 00	116,393 75	20–43.	Miscellaneous Grants, etc.	17	149,150 00	
$ 342,736 00	$ 353,683 75					386,778 00
			DEPARTMENT OF THE ATTORNEY-GENERAL:			
11,310 00	$ 12,310 00	44.	Attorney-General's Office	17–18	$ 11,810 00	
26,040 00	26,040 00	45.	General Office	18	26,940 00	
19,005 00	20,655 00	46.	Joint-stock Companies and Insurance Branch	18–19	26,010 00	
6,740 00	7,040 00	47.	Municipal Branch	19	7,140 00	
15,372 00	15,772 00	48.	Censor of Moving Pictures	19	15,522 00	
19,180 00	29,520 00	49.	"Prohibition Act"—Administration	19–20	6,580 00	
28,246 00	30,346 00	50–52.	Sheriffs' Offices	20	29,806 00	
2,840 00	2,840 00	53.	Official Guardian	21	2,740 00	
7,360 00	7,360 00	54.	Legal Offices Branch	21	7,290 00	
222,850 00	233,105 00	55–60.	Land Registry Offices	21–26	210,304 00	
79,798 00	86,164 00	61–68.	Supreme and County Courts	26–29	83,349 00	
361,900 00	411,900 00	69.	Provincial Police	29	400,601 00	
85,580 00	85,580 00	70–71.	County Gaols	29–30	119,385 00	
71,179 00	71,179 00	72.	Industrial Schools	30–31	30,050 00	
957,400 00	$ 1,039,811 00		*Carried forward*		$ 977,527 00	$3,339,961 08

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.			Fiscal Year 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.					
			CURRENT ACCOUNT—*Continued.*			
$ 957,400 00	$ 1,039,811 00		*Brought forward*		$ 977,527 00	$3,339,961 08
				Page.		
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
		73.	"Infants Act" and "Mothers' Pensions Act"—Administration	31 ..	43,680 00	
38,960 00	48,295 00					
		74.	"Motor-vehicle Act"—Administration	32 ..	48,000 00	
9,500 00	24,500 00					
24,360 00	24,360 00	.....	Public Utilities Commission	32 ..	.....	
153,500 00	179,500 00	75–86.	Miscellaneous Votes	32 ..	190,000 00	
.....	245,000 00	86A.	"Mothers' Pensions Act"	33 ..	400,000 00	
$ 1,183,720 00	$ 1,561,466 00					1,659,207 00
			DEPARTMENT OF EDUCATION:			
$ 25,342 00	$ 27,342 00	87.	General Office	33 ..	$ 29,152 00	
79,106 00	86,936 00	88.	Free Text-book Branch	33 ..	94,880 00	
30,530 00	30,664 00	89.	Agricultural Education	34 ..	29,280 00	
121,710 00	122,260 00	90.	Industrial Education	34 ..	96,270 00	
62,580 00	66,180 00	91.	Inspection of Schools	35 ..	75,880 00	
75,405 00	79,290 50	92–93.	Normal Schools	35–37 ..	82,315 00	
40,000 00	40,000 00	94.	Deaf, Dumb, and Blind	37 ..	47,600 00	
1,138,500 00	1,138,500 00	95–97.	*Per Capita* Grants	37 ..	1,207,500 00	
514,340 00	514,340 00	98–99.	Teachers' Salaries	37 ..	560,000 00	
320,000 00	380,000 00	100.	School Buildings	37 ..	400,000 00	
37,100 00	41,350 00	101–106.	Miscellaneous Votes	38 ..	50,350 00	
420,000 00	420,000 00	107.	University of British Columbia	38 ..	445,000 00	
.....	300,000 00	107A.	Rural District School Taxes	38 ..	300,000 00	
$ 2,864,613 00	$ 3,246,862 50					3,418,227 00
			DEPARTMENT OF FINANCE:			
$ 12,200 00	$ 12,200 00	108.	Minister's Office	38 ..	$ 12,820 00	
32,156 00	32,156 00	109.	General Office	38–39 ..	37,796 00	
		110.	Inspection of Trust Companies, Probate and Succession Duties	39 ..	14,830 00	
15,825 00	15,825 00					
51,900 00	51,960 00	111.	Controlling and Audit Branch	39–40 ..	53,720 00	
113,580 00	113,580 00	112.	Surveyor of Taxes	40–41 ..	121,512 00	
		113.	"Amusements Tax Act"—Operation	41 ..	6,320 00	
6,634 00	6,634 00					
32,772 00	32,772 00	114.	Bureau of Information	41 ..	34,872 00	
84,450 00	84,450 00	115.	Agent-General's Office, London	41–42 ..	79,300 00	
		116–157.	Government Agents and Assessors, etc.	42–57 ..	538,363 99	
533,222 00	537,216 00					
76,840 00	76,840 00	158–162.	Miscellaneous Votes	57 ..	60,917 00	
$ 959,579 00	$ 963,633 00					960,450 99
			Carried forward			$9,377,846 07

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.	Page.			Fiscal Year, 1921–22.
			CURRENT ACCOUNT—*Continued.*				
			Brought forward				$9,377,846 07
18,090 00	$ 18,090 00	163.	DEPARTMENT OF FISHERIES	58			18,090 00
28,300 00	$ 28,300 00	164.	DEPARTMENT OF INDUSTRIES	58			28,300 00
			DEPARTMENT OF LABOUR:				
15,540 00	$ 16,197 80	165.	General Office	58–59		$ 14,940 00	
9,380 00	9,380 00	166.	Minimum Wage Board	59		8,930 00	
72,680 00	72,852 35	167.	Employment Service	59–63		72,870 00	
97,600 00	$ 98,430 15						96,740 00
			DEPARTMENT OF LANDS:				
12,942 00	$ 12,942 00	168.	Minister's Office	63		$ 12,442 00	
33,224 00	33,265 95	169.	General Office (Salaries)	63–64		34,220 00	
45,128 00	45,158 00	170.	Lands Branch (Salaries)	64–65		43,316 00	
75,974 00	76,094 28	171.	Survey Branch (Salaries)	65–66		72,744 00	
95,812 00	95,842 00	172.	Water Rights Branch (Salaries)	66–67		88,092 00	
221,410 00	221,530 00	173.	Forest Branch (Salaries)	68–73		220,686 00	
25,000 00	25,000 00	174.	Temporary Assistance (Salaries)	73		25,000 00	
179,705 00	179,705 00	175.	Expenses, General Office and Branches	73–74		212,200 00	
635,200 00	720,700 00	176–195.	Miscellaneous Votes	74		1,065,700 00	
1,324,395 00	$ 1,410,237 23						1,774,400 00
			DEPARTMENT OF MINES:				
10,565 00	$ 10,565 00	196.	Minister's Office	75		$ 10,565 00	
19,702 00	19,702 00	197.	General Office	75		20,090 00	
40,600 00	40,600 00	198.	Mines Inspection Branch	75–76		40,300 00	
16,630 00	16,630 00	199.	Bureau of Mines	76		16,530 00	
17,330 00	17,330 00	200.	Mine-rescue and Training Stations	76		13,645 00	
181,000 00	231,000 00	201–206.	Miscellaneous Votes	76–77		115,500 00	
89,374 38	89,374 38	206A.–206B.	Statutory—Mines and Mineral Development	77		89,374 38	
375,201 38	$ 425,201 38						306,004 38
			DEPARTMENT OF THE PROVINCIAL SECRETARY:				
9,440 00	$ 9,440 00	207.	Minister's Office	77		$ 9,560 00	
14,180 00	14,180 00	208.	General Office	77–78		15,550 00	
67,030 00	66,390 00	209.	Provincial Board of Health	78		90,610 00	
20,520 00	18,580 00	210.	Provincial Library and Archives	78–79		19,570 00	
8,100 00	8,100 00	211.	"Public Libraries Act"	79		13,020 00	
119,270 00	$ 116,690 00		*Carried forward*			$ 148,310 00	$11,601,380 45

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.	Page.		Fiscal Year, 1921–22.
			CURRENT ACCOUNT—*Continued.*			
$ 119,270 00	$ 116,690 00		*Brought forward*		$ 148,310 00	$11,601,380 47
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*			
10,608 00	10,668 00	212.	Provincial Museum	79 ..	10,668 00	
627,616 00	627,616 00	213–216.	Mental Hospitals	80–82 ..	730,546 00	
42,945 00	42,945 00	217.	Provincial Home, Kamloops	82 ..	47,145 00	
527,250 00	528,250 00	218–223.	Grants to Hospitals and Charities	83 ..	478,250 00	
189,747 48	235,047 48	224.	King's Printer	83 ..	217,411 48	
15,650 00	15,650 00	225.	Civil Service Commissioner	83–84 ..	15,340 00	
480,000 00	555,000 00	226–239.	Miscellaneous Votes	84 ..	748,500 00	
$ 2,013,086 48	$ 2,131,866 48					2,396,170 48
			DEPARTMENT OF PUBLIC WORKS:			
$ 11,040 00	$ 11,040 00	240.	Minister's Office	85 ..	$ 11,040 00	
64,754 00	67,774 00	241.	Administration	85–86 ..	64,924 00	
127,164 00	128,534 00	242.	Parliament Buildings and Grounds	86–87 ..	143,260 00	
19,400 00	19,400 00	243.	Government House and Grounds	88 ..	22,820 00	
58,000 00	58,080 00	244.	District Engineers	88 ..	66,040 00	
54,807 00	57,361 00	245.	Steam-boiler Inspection	88–89 ..	75,610 00	
8,350 00	8,350 00	246.	"Electrical Energy Inspection Act"	89 ..	8,590 00	
8,618 00	8,618 00	247.	"Factories Act"	90 ..	8,928 00	
2,197,600 00	2,197,600 00	248.	Roads, Streets, Bridges, and Wharves	90 ..	2,241,100 00	
195,490 00	195,490 00	249.	Steamboats, Ferries, and Bridge-tenders	90 ..	261,556 00	
.....	5,000 00	.....	Miscellaneous	90 ..	.....	
$ 2,745,223 00	$ 2,757,247 00					2,903,808 00
			DEPARTMENT OF RAILWAYS:			
$ 24,900 00	$ 24,900 00	250.	General Office	90–91 ..	$ 24,600 00	
25,000 00	50,000 00	251.	New Westminster Bridge	91 ..	50,000 00	
$ 49,900 00	$ 74,900 00					74,600 00
$13,963,871 94	$15,031,345 57		Total, Current Account			$16,975,958 97
			CAPITAL ACCOUNT.			
$ 1,183,761 36	$ 1,183,761 36	252.	Sinking Funds	92 ..	$1,247,081 36	
907,200 00	907,200 00	253.	Pacific Great Eastern Railway Co.	92 ..	773,884 00	
1,359,000 00	1,359,000 00	254–265.	Miscellaneous Votes	92 ..	937,800 00	
$ 3,449,961 36	$ 3,449,961 36		Total, Capital Account			2,958,765 36
$17,413,833 30	$18,481,306 93		Total Estimated Expenditure for fiscal year 1921–22			$19,934,724 33

ESTIMATES OF EXPENDITURE

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE

FISCAL YEAR ENDING 31ST MARCH, 1922

Estimates and Special Warrants etc., for Fiscal Year 1920–21.	No. of Vote.	SERVICE.		Fiscal Year. 1921–22.
	1.	PUBLIC DEBT.		
		INTEREST.		
$ 297,658 08		"Loan Acts, 1891, 1893, 1895, 1899, and 1902"—Interest @ 3% on amount of Inscribed Stock, viz., $9,921,936	$297,658 08	
327,375 00		"Loan Act, 1914"—Interest @ 4½% on the amount of Inscribed Stock, viz., $7,275,000	327,375 00	
140,850 00		"Loan Act, 1915"—Interest @ 4½% on Debentures of $3,130,000	140,850 00	
90,000 00		"Loan Act, 1916"—Interest @ 4½% on Debentures of $2,000,000	90,000 00	
322,500 00		"Loan Act, 1916 (Amendments, 1917, 1918, and 1919)—Interest @ 5% on $6,450,000 Debentures	322,500 00	
55,000 00		"Loan Act, 1917"—Interest @ 5% on Debentures of $1,100,000 (Land Settlement Board)	55,000 00	
165,000 00		"Loan Act, 1918"—Interest @ 5½% on Debentures of $3,000,000	165,000 00	
15,575 00		Dyking Debentures, 1897 and 1899—Interest @ 3½% on $445,000	15,575 00	
47,400 00		"Corporation of the District of South Vancouver Aid Act, 1918"—Interest @ 6% on Treasury Notes of $790,000	47,400 00	
37,500 00		"Better Housing Act, 1919"—Interest @ 5% on Debentures of $1,361,500	68,075 00	
.....		"Pacific Great Eastern Note Payment Loan Act, 1920"—Interest @ 6% on Debentures of $4,828,000	289,680 00	
.....		"Pacific Great Eastern Construction Loan Act, 1920"—Interest @ 6% on Debentures of $4,000,000	240,000 00	
.....		"Loan Act, 1920"—Interest @ 6% on Debentures of $1,000,000	60,000 00	
240,000 00		"Loan Acts, 1916, 1917, 1918, 1919, 1920" Revenue and other Acts—Interest on Treasury Bills	500,000 00	
$1,738,858 08				$2,619,113 08
		PREMIUM AND EXCHANGE.		
$ 40,000 00		On drafts for Interest remittances (approximate)		100,000 00
		DISCOUNT AND COMMISSION.		
$ 1,200 00		½% Commission to Loan Trustees on sums annually invested (approximate)	$ 1,200 00	
5,820 00		Annual Commission for inscribing and paying interest on Inscribed Stock, £1,200	5,820 00	
$ 7,020 00		*Carried forward*	$ 7,020 00	$2,719,113 08

Estimates and Special Warrants etc., for Fiscal Year 1920–21.	No. of Vote.	SERVICE.		Fiscal Year. 1921–22.
	1.	PUBLIC DEBT—*Continued.*		
		DISCOUNT AND COMMISSION—*Continued.*		
$ 7,020 00		*Brought forward*	$ 7,020 00	$2,719,113 08
1,000 00		Brokerage, Dividend Warrant Stamps, and postage in London on Sinking Fund Investments and payments of Interest (approximate)	1,000 00	
1,500 00		Commission for payment of Interest on Loans of 1915, 1916, 1917, 1918, 1919, 1920 (approximate)	2,500 00	
50,000 00		Discount and Commission on future Loans, Treasury Bills, Debentures, etc. (approximate)	100,000 00	
$ 59,520 00				110,520 00
$1,838,378 08		Total of Vote No. 1		$2,829,633 08
	2.	LEGISLATION.		
		Members' Indemnities:		
$ 75,200 00		Forty-seven Members @ $1,600 each	$ 75,200 00	
7,000 00		Mileage	7,000 00	
1,500 00		Allowance to the Leader of the Opposition	1,500 00	
$ 83,700 00				$ 83,700 00
		Salaries:		
$ 1,800 00		Mr. Speaker, Sessional allowance	$ 1,800 00	
500 00		Deputy Speaker, Sessional allowance	500 00	
1,200 00		Clerk of the House, Sessional allowance	1,200 00	
600 00		Law Clerk, Sessional allowance	600 00	
480 00		Sergeant-at-Arms, 12 weeks @ $40 per week	480 00	
270 00		Deputy Sergeant-at-Arms, 9 weeks @ $30 per week	270 00	
200 00		Assistant Sergeant-at-Arms, 8 weeks @ $25 per week	200 00	
2,400 00		Twelve Attendants, 8 weeks @ $25 per week	2,400 00	
360 00		Six Pages, 8 weeks @ $7.50 per week	360 00	
280 00		Two Stenographers, 8 weeks @ $17.50 per week	280 00	
480 00		Four Stenographers, 8 weeks @ $15 per week	480 00	
500 00		Unforeseen and unprovided	500 00	
$ 9,070 00				9,070 00
		Expenses:		
$ 1,150 00		Office supplies, etc.	$ 1,850 00	
12,000 00		Printing, binding, etc.	12,000 00	
250 00		Furniture and fixtures	250 00	
1,000 00		Select Standing Committees	1,000 00	
1,500 00		Dining-room	1,500 00	
500 00		Incidentals	500 00	
$ 16,400 00				17,100 00
$ 109,170 00		Total of Vote No. 2		$ 109,870 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates Approved by Legislature.	Increased under Special Warrants, etc.				
		3.	PREMIER'S OFFICE.		
			Salaries:		
7,500 00	$ 7,500 00		The Premier (without any further salary as head of any Department)	$ 7,500 00	
2,100 00	2,100 00		Secretary	2,100 00	
1,080 00	1,080 00		Clerk and Stenographer	1,080 00	
10,680 00	$ 10,680 00			$ 10,680 00	
			Expenses:		
1,700 00	1,700 00		Office supplies, etc.	1,000 00	
1,500 00	1,500 00		Travelling expenses, etc.	2,000 00	
13,880 00	$ 13,880 00		Total of Vote No. 3		$ 13,680 00
			DEPARTMENT OF AGRICULTURE.		
		4.	MINISTER'S OFFICE.		
			Salaries:		
6,000 00	$ 6,000 00		The Minister	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
840 00	840 00		Clerk and Stenographer	900 00	
8,880 00	$ 8,880 00			$ 8,940 00	
			Expenses:		
500 00	500 00		Office supplies, etc.	500 00	
2,000 00	2,000 00		Travelling expenses, etc.	2,000 00	
11,380 00	$ 11,380 00		Total of Vote No. 4		$ 11,440 00
		5.	GENERAL OFFICE.		
			Salaries:		
4,120 00	$ 4,120 00		Deputy Minister	$ 4,120 00	
2,020 00	2,020 00		Chief Clerk	2,020 00	
1,780 00	1,780 00		Accountant	1,780 00	
.....	.....		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	.....	
1,452 00	1,452 00		Clerk	1,452 00	
1,392 00	1,392 00		Clerk	1,452 00	
1,392 00	1,392 00		Clerk	1,392 00	
540 00	540 00		Junior Clerk	.....	
420 00	420 00		Messenger	420 00	
960 00	960 00		Stenographer	900 00	
900 00	900 00		Stenographer	840 00	
900 00	900 00		Stenographer	840 00	
.....	.....		Stenographer	780 00	
2,500 00	2,500 00		Temporary assistance	1,500 00	
19,828 00	$ 19,828 00		*Carried forward*	$ 18,996 00	$ 11,440 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF AGRICULTURE—*Continued.*		
		5.	GENERAL OFFICE—*Continued.*		
$ 19,828 00	$ 19,828 00		*Brought forward*	$ 18,996 00	$ 11,440
			Expenses:		
13,830 00	13,830 00		Office supplies, etc.	14,000 00	
2,000 00	2,000 00		Travelling expenses, etc.	2,000 00	
$ 35,658 00	$ 35,658 00		Total of Vote No. 5		34,996
		6.	HORTICULTURAL BRANCH.		
			Salaries:		
.....			Provincial Horticulturist	$ 2,400 00	
$ 2,220 00	$ 2,220 00		District Horticulturist	2,220 00	
2,220 00	2,220 00		District Horticulturist	2,220 00	
2,220 00	2,220 00		District Horticulturist	2,220 00	
2,100 00	2,100 00		District Horticulturist	2,220 00	
1,620 00	1,620 00		District Horticulturist	1,620 00	
1,740 00	1,740 00		Assistant District Horticulturist	1,980 00	
1,620 00	1,620 00		District Field Inspector	1,620 00	
1,620 00	1,620 00		District Field Inspector	1,620 00	
1,620 00	1,620 00		District Field Inspector	1,620 00	
1,620 00	1,620 00		District Field Inspector	1,620 00	
1,480 00	1,480 00		District Field Inspector	1,480 00	
1,440 00	1,440 00		District Field Inspector	1,440 00	
1,320 00	1,500 00		District Field Inspector	1,500 00	
1,500 00	1,500 00		Clerk (Victoria)	1,500 00	
636 00	1,200 00		Clerk (Vernon)	1,320 00	
480 00	480 00		Stenographer (Penticton)	.....	
840 00	840 00		Stenographer (Victoria)	840 00	
1,000 00	1,000 00		Temporary assistance	1,000 00	
$ 27,296 00	$ 28,040 00			$ 30,440 00	
			Expenses:		
7,500 00	7,500 00		Travelling expenses, etc.	8,000 00	
$ 34,796 00	$ 35,540 00		Total of Vote No. 6		38,44 00
		7.	INSPECTION OF IMPORTED AND EXPORTED HORTICULTURAL AND FIELD PRODUCTS, ETC.		
			Salaries:		
$ 2,520 00	$ 2,520 00		Chief Inspector	$ 2,520 00	
1,800 00	1,800 00		Inspector	1,800 00	
1,780 00	1,780 00		Inspector	1,780 00	
1,600 00	1,600 00		Inspector	1,600 00	
1,600 00	1,600 00		Inspector	1,600 00	
1,720 00	1,720 00		Inspector	1,720 00	
1,500 00	1,500 00		Inspector	1,500 00	
$ 12,520 00	$ 12,520 00		*Carried forward*	$ 12,520 00	$ 84,87 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF AGRICULTURE—*Continued.*		
		7.	INSPECTION OF IMPORTED AND EXPORTED HORTICULTURAL AND FIELD PRODUCTS, ETC.—*Continued.*		
12,520 00	$ 12,520 00		*Brought forward*	$ 12,520 00	$ 84,876 00
			Salaries—*Continued.*		
960 00	960 00		Clerk and Stenographer	900 00	
780 00	780 00		Clerk and Stenographer	780 00	
14,260 00	$ 14,260 00			$ 14,200 00	
			Expenses:		
1,000 00	1,000 00		Office supplies, etc.	1,500 00	
1,200 00	1,200 00		Travelling expenses, etc.	2,400 00	
7,000 00	7,000 00		Inspection fees, casual labour, and other expenses	7,000 00	
23,460 00	$ 23,460 00		Total of Vote No. 7		25,100 00
		8.	CONTROL OF FRUIT PESTS, DISEASES, ETC.		
			Expenses:		
14,000 00	$ 14,000 00		Labour, material, supplies, etc.	$ 15,000 00	
14,000 00	$ 14,000 00		Total of Vote No. 8		15,000 00
		9.	ENTOMOLOGY AND PLANT PATHOLOGY.		
			Salaries:		
2,280 00	$ 2,280 00		Plant Pathologist	$ 2,280 00	
500 00	500 00		Temporary assistance	500 00	
2,780 00	$ 2,780 00			$ 2,780 00	
			Expenses:		
1,500 00	1,500 00		Office and laboratory supplies, etc.	500 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,000 00	
5,780 00	$ 5,780 00		Total of Vote No. 9		4,280 00
		10.	MARKETS COMMISSIONER.		
			Salaries:		
2,520 00	$ 2,520 00		Commissioner	$ 2,520 00	
900 00	900 00		Clerk and Stenographer	900 00	
300 00	300 00		Temporary assistance	300 00	
3,720 00	$ 3,720 00		Expenses:		
4,500 00	4,500 00		Office supplies, etc.	4,500 00	
2,500 00	2,500 00		Travelling expenses, etc.	2,500 00	
10,720 00	$ 10,720 00		Total of Vote No. 10		10,720 00
			Carried forward		$ 139,976 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF AGRICULTURE—*Continued.*		
			Brought forward		$ 139,976
		11.	COAST MARKETS COMMISSIONER.		
			(Now under Markets Commissioner, Vote No. 10.)		
			Salaries:		
$ 2,760 00	$ 2,760 00		Commissioner	.....	
1,080 00	1,080 00		Clerical staff, etc.	.....	
$ 3,840 00	$ 3,840 00			.....	
			Expenses:		
5,500 00	5,500 00		Office supplies, etc.	.....	
3,000 00	3,000 00		Travelling expenses, etc.	.....	
$ 12,340 00	$ 12,340 00		Total of Vote No. 11		.....
		12.	LIVE STOCK BRANCH.		
			Salaries:		
$ 2,760 00	$ 2,760 00		Commissioner	$ 2,760 00	
1,600 00	1,600 00		Brand Inspector	1,600 00	
1,720 00	1,720 00		Brand Recorder	1,720 00	
1,392 00	1,392 00		Clerk	1,392 00	
960 00	960 00		Clerk	960 00	
840 00	840 00		Stenographer	780 00	
500 00	500 00		Temporary assistance	750 00	
$ 9,772 00	$ 9,772 00			$ 9,962 00	
			Expenses:		
2,500 00	2,500 00		Travelling expenses, etc.	2,500 00	
$ 12,272 00	$ 12,272 00		Total of Vote No. 12		12,462
		13.	POULTRY DIVISION.		
			Salaries:		
$ 2,040 00	$ 2,040 00		Chief Instructor	$ 2,040 00	
1,920 00	1,920 00		District Poultry Instructor	1,800 00	
1,800 00	1,800 00		District Poultry Instructor	1,800 00	
1,320 00	1,320 00		Clerk	.....	
810 00	810 00		Stenographer	810 00	
.....	.....		Temporary assistance	200 00	
$ 7,890 00	$ 7,890 00			$ 6,650 00	
			Expenses:		
800 00	800 00		Travelling expenses, etc.	2,000 00	
$ 8,690 00	$ 8690 00		Total of Vote No. 13		8,650
			Carried forward		$ 161,088

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF AGRICULTURE—*Continued.*		
			Brought forward		$ 161,088 00
		14.	SOIL AND CROP DIVISION.		
			Salaries:		
.....	$ 2,000 00		Chief Instructor	$ 2,400 00	
1,920 00	1,920 00		Assistant Instructor	1,920 00	
810 00	810 00		Stenographer	810 00	
2,730 00	$ 4,730 00			$ 5,130 00	
			Expenses:		
.....	.....		Office supplies, etc.	500 00	
2,000 00	2,000 00		Travelling expenses, etc.	2,500 00	
.....	.....		Potato certification and seed improvement	1,500 00	
4,730 00	$ 6,730 00		Total of Vote No. 14		9,630 00
		15.	DAIRY BRANCH.		
			Salaries:		
2,520 00	$ 2,520 00		Commissioner	$ 2,520 00	
2,040 00	2,040 00		Dairy Instructor	2,100 00	
1,200 00	1,200 00		Milk-tester	1,200 00	
1,200 00	1,200 00		Milk-tester	1,200 00	
.....	.....		Temporary assistance	200 00	
6,960 00	$ 6,960 00			$ 7,220 00	
			Expenses:		
.....	.....		Office supplies, etc.	500 00	
1,200 00	1,200 00		Travelling expenses, etc.	1,800 00	
8,160 00	$ 8,160 00		Total of Vote No. 15		9,520 00
		16.	VETERINARY BRANCH.		
			Salaries:		
2,220 00	$ 2,220 00		Chief Veterinary Inspector	$ 2,220 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
1,980 00	1,980 00		Veterinary Inspector	1,980 00	
.....	.....		Veterinary Inspector	1,800 00	
1,200 00	1,200 00		Clerk and Stenographer	1,320 00	
.....	.....		Temporary assistance	500 00	
17,280 00	$ 17,280 00		*Carried forward*	$ 19,700 00	$ 180,238 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF AGRICULTURE—*Continued.*		
		16.	VETERINARY BRANCH—*Continued.*		
$ 17,280 00	$ 17,280 00		*Brought forward*	$ 19,700 00	$ 180,238 00
			Expenses:		
.....	.....		Office supplies, etc.	500 00	
11,500 00	11,500 00		Travelling expenses, etc.	13,000 00	
$ 28,780 00	$ 28,780 00		Total of Vote No. 16		33,200 00
		17.	STATISTICS.		
			Salaries:		
$ 1,420 00	$ 1,420 00		Statistician	$ 1,420 00	
300 00	300 00		Temporary assistance	700 00	
				$ 2,120 00	
$ 1,720 00	$ 1,720 00		Expenses:		
2,000 00	2,000 00		Office supplies, etc.	1,400 00	
1,000 00	1,000 00		Travelling expenses, etc.	1,200 00	
$ 4,720 00	$ 4,720 00		Total of Vote No. 17		4,720 00
		18.	DISTRICT AGRICULTURISTS, ETC.		
			Salaries:		
$ 1,920 00	$ 1,920 00		District Agriculturist	$ 2,100 00	
1,620 00	1,620 00		District Agriculturist	1,800 00	
1,620 00	1,620 00		District Agriculturist	1,800 00	
900 00	900 00		Clerk and Stenographer (Victoria)	.....	
900 00	900 00		Clerk and Stenographer (Kamloops)	900 00	
240 00	420 00		Clerk and Stenographer (Duncan)	420 00	
.....	.....		Temporary assistance	1,250 00	
$ 7,200 00	$ 7,380 00			$ 8,270 00	
			Expenses:		
2,500 00	2,500 00		Office supplies, etc.	2,500 00	
7,500 00	7,500 00		Travelling expenses, etc.	5,500 00	
$ 17,200 00	$ 17,380 00		Total of Vote No. 18		16,270 00
		19.	WORKSHOP AND SHIPPING OFFICE.		
			Salaries:		
$ 1,500 00	$ 1,680 00		General Assistant	$ 1,680 00	
.....	.....		Temporary assistance	1,300 00	
$ 1,500 00	$ 1,680 00			$ 2,980 00	
			Expenses:		
.....	.....		Office supplies, etc.	120 00	
.....	.....		Travelling expenses, etc.	100 00	
$ 1,500 00	$ 1,680 00		Total of Vote No. 19		3,200 00
			Carried forward		$ 237,628 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF AGRICULTURE—*Continued.*		
			Brought forward		$ 237,628 00
			MISCELLANEOUS GRANTS, ETC.		
		20.	Tubercular cattle—compensation, supplies, temporary		
30,000 00	$ 30,000 00		assistance, etc.	$ 30,000 00	
6,000 00	6,000 00	21.	Automobiles and accessories, etc.	6,000 00	
35,000 00	41,000 00	22.	Agricultural fairs, etc.	41,000 00	
9,000 00	9,000 00	23.	Farmers' Institutes, etc.	9,000 00	
7,000 00	7,000 00	24.	Women's Institutes, etc.	7,000 00	
500 00	500 00	25.	British Columbia Bee-keepers' Association	500 00	
2,500 00	2,500 00	26.	British Columbia Dairymen's Association	2,500 00	
250 00	250 00	27.	British Columbia Entomological Society	250 00	
3,000 00	3,000 00	28.	British Columbia Fruit-growers' Association	3,000 00	
750 00	750 00	29.	British Columbia Goat-breeders' Association	500 00	
1,500 00	1,500 00	30.	British Columbia Poultry Association	1,500 00	
2,500 00	2,500 00	31.	British Columbia Stock-breeders' Association	2,500 00	
750 00	750 00	32.	British Columbia Wool-growers' Associations	1,000 00	
		33.	United Seed-growers, Limited ($2,500 to be refunded		
2,500 00	2,500 00		by Dominion Government)	5,000 00	
300 00	300 00	34.	Board of Horticulture	150 00	
3,000 00	3,000 00	35.	Departmental exhibits	2,000 00	
500 00	750 00	36.	Compensation *re* foul-brood in bees	500 00	
1,000 00	1,000 00	37.	Control of noxious weeds	1,000 00	
1,000 00	1,000 00	38.	Grants to British Columbia students	1,000 00	
.....	.....	39.	Western Canada Live Stock Union	250 00	
.....	1,593 75	40.	Compensation *re* codling-moth control	1,500 00	
1,500 00	1,500 00	41.	Incidentals and contingencies	1,000 00	
.....	.....	42.	Survey *re* Oriental land-owners	2,000 00	
		43.	Grants to settlers in aid of purchase of stumping-		
.....	.....		powder for land-clearing purposes	30,000 00	
108,550 00	$ 116,393 75		Total, Miscellaneous Grants, etc.		149,150 00
342,736 00	$ 353,683 75		Total, Department of Agriculture		$ 386,778 00
			DEPARTMENT OF THE ATTORNEY-GENERAL.		
		44.	ATTORNEY-GENERAL'S OFFICE.		
			Salaries:		
6,000 00	$ 6,000 00		The Attorney-General	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
1,020 00	1,020 00		Clerk and Stenographer	1,020 00	
9,060 00	$ 9,060 00		*Carried forward*	$ 9,060 00	

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
		44.	ATTORNEY-GENERAL'S OFFICE—*Continued.*		
$ 9,060 00	$ 9,060 00		*Brought forward*	$ 9,060 00	
			Expenses:		
750 00	750 00		Office supplies, etc.	750 00	
1,500 00	2,500 00		Travelling expenses, etc.	2,000 00	
$ 11,310 00	$ 12,310 00		Total of Vote No. 44		$ 11,810 00
		45.	GENERAL OFFICE.		
			Salaries:		
$ 4,920 00	$ 4,920 00		Deputy Attorney-General	$ 4,920 00	
4,320 00	4,320 00		Legislative Counsel	4,800 00	
3,720 00	3,720 00		Departmental Solicitor	4,200 00	
2,020 00	2,020 00		Chief Clerk	2,020 00	
1,720 00	1,720 00		Voucher Clerk	1,720 00	
1,080 00	1,080 00		Clerk and Stenographer	1,080 00	
870 00	870 00		Clerk and Stenographer	870 00	
900 00	900 00		Clerk and Stenographer	900 00	
960 00	960 00		Clerk	900 00	
780 00	780 00		Stenographer	780 00	
250 00	250 00		Temporary assistance	250 00	
$ 21,540 00	$ 21,540 00			$ 22,440 00	
			Expenses:		
3,500 00	3,500 00		Office supplies, etc.	3,500 00	
1,000 00	1,000 00		Travelling expenses, etc.	1,000 00	
$ 26,040 00	$ 26,040 00		Total of Vote No. 45		26,940 00
		46.	JOINT-STOCK COMPANIES AND INSURANCE BRANCH.		
			Salaries:		
$ 3,920 00	$ 3,920 00		Registrar	$ 3,920 00	
.....	.....		Superintendent of Insurance	3,600 00	
2,220 00	2,220 00		Fire Investigator	2,220 00	
1,780 00	1,900 00		Chief Clerk	1,780 00	
1,300 00	1,300 00		Clerk	1,300 00	
960 00	960 00		Stenographer	960 00	
870 00	870 00		Stenographer	870 00	
720 00	720 00		Junior Clerk	720 00	
360 00	360 00		Office-boy	360 00	
.....	.....		Stenographer	780 00	
200 00	1,730 00		Temporary assistance	500 00	
$ 12,330 00	$ 13,980 00			$ 17,010 00	
			Expenses:		
3,425 00	3,425 00		Office supplies, etc.	5,500 00	
250 00	250 00		Travelling expenses, etc.	250 00	
$ 16,005 00	$ 17,655 00		*Carried forward*	$ 22,760 00	$ 38,750 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
		46.	JOINT-STOCK COMPANIES AND INSURANCE BRANCH—*Continued.*		
$ 16,005 00	$ 17,655 00		*Brought forward*	$ 22,760 00	$ 38,750 00
			Expenses—*Continued.*		
1,000 00	1,000 00		Fire Report fees and expenses	1,000 00	
2,000 00	2,000 00		Fire inquiries and fire protection	2,250 00	
$ 19,005 00	$ 20,655 00		Total of Vote No. 46		26,010 00
		47.	MUNICIPAL BRANCH.		
			Salaries:		
$ 3,120 00	$ 3,120 00		Inspector of Municipalities	$ 3,120 00	
1,600 00	1,600 00		Clerk	1,600 00	
870 00	870 00		Stenographer	870 00	
$ 5,590 00	$ 5,590 00			$ 5,590 00	
			Expenses:		
650 00	$ 900 00		Office supplies, etc.	1,000 00	
500 00	550 00		Travelling expenses, etc.	550 00	
$ 6,740 00	$ 7,040 00		Total of Vote No. 47		7,140 00
		48.	CENSOR OF MOVING PICTURES.		
			Salaries:		
$ 2,220 00	$ 2,620 00		Censor	$ 2,820 00	
1,800 00	1,800 00		Assistant Censor	1,800 00	
1,600 00	1,600 00		Assistant Censor	1,600 00	
1,600 00	1,600 00		Assistant Censor	1,600 00	
1,800 00	1,800 00		Inspector	1,800 00	
1,440 00	1,440 00		Operator	1,440 00	
750 00	750 00		Clerk (half-salary)	750 00	
912 00	912 00		Stenographer	912 00	
150 00	150 00		Temporary assistance	.....	
$ 12,272 00	$ 12,672 00			$ 12,722 00	
			Expenses:		
800 00	800 00		Office supplies, etc.	500 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,500 00	
800 00	800 00		Machine supplies, etc.	800 00	
$ 15,372 00	$ 15,772 00		Total of Vote No. 48		15,522 00
		49.	ADMINISTRATION OF "PROHIBITION ACT" (THREE MONTHS).		
			Salaries:		
$ 3,720 00	$ 4,000 00		Commissioner	$ 490 00	
5,260 00	5,320 00		Clerical staff, etc.	1,040 00	
$ 8,980 00	$ 9,320 00		*Carried forward*	$ 1,530 00	$ 87,422 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
		49.	ADMINISTRATION OF "PROHIBITION ACT" (THREE MONTHS)—*Continued.*		
$ 8,980 00	$ 9,320 00		*Brought forward*	$ 1,530 00	$ 87,422 00
			Expenses:		
3,000 00	3,000 00		Office supplies, etc.	750 00	
1,200 00	1,200 00		Travelling expenses, etc.	300 00	
6,000 00	6,000 00		Special Operators	1,500 00	
.....	10,000 00		Seizures and prosecutions	2,500 00	
$ 19,180 00	$ 29,520 00		Total of Vote No. 49		6,580 00
			SHERIFFS' OFFICES.		
		50.	VANCOUVER.		
			Salaries:		
$ 4,120 00	$ 4,120 00		Sheriff	$ 4,120 00	
2,220 00	2,220 00		Deputy Sheriff	2,220 00	
1,392 00	1,392 00		Process Server	1,392 00	
1,152 00	1,152 00		Clerk	1,152 00	
.....	.....		Clerk	960 00	
250 00	250 00		Temporary assistance	1,250 00	
$ 9,134 00	$ 9,134 00			$ 11,094 00	
			Expenses:		
750 00	2,850 00		Office supplies, etc.	1,000 00	
600 00	600 00		Travelling expenses, etc.	500 00	
$ 10,484 00	$ 12,584 00		Total of Vote No. 50		$ 12,594 00
		51.	VICTORIA.		
			Salaries:		
$ 3,000 00	$ 3,000 00		Sheriff	$ 3,000 00	
2,100 00	2,100 00		Deputy Sheriff	2,100 00	
1,212 00	1,212 00		Process Server	1,212 00	
900 00	900 00		Clerk and Stenographer	900 00	
200 00	200 00		Temporary assistance	100 00	
$ 7,412 00	$ 7,412 00			$ 7,312 00	
			Expenses:		
950 00	950 00		Office supplies, etc.	750 00	
400 00	400 00		Travelling expenses, etc.	150 00	
$ 8,762 00	$ 8,762 00		Total of Vote No. 51		8,212 00
		52.	SUNDRY SHERIFFS.		
$ 9,000 00	$ 9,000 00		Allowances and office supplies, etc.	$ 9,000 00	
$ 9,000 00	$ 9,000 00		Total of Vote No. 52		9,000 00
$ 28,246 00	$ 30,346 00		Total, Sheriffs' Offices		29,806 00
			Carried forward		$ 123,808 00

FISCAL YEAR, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			Brought forward		$ 123,808 00
		53.	OFFICIAL GUARDIAN, VANCOUVER.		
			Salaries:		
$ 1,800 00	$ 1,800 00		Official Guardian	$ 1,800 00	
840 00	840 00		Stenographer	840 00	
$ 2,640 00	$ 2,640 00			$ 2,640 00	
			Expenses:		
200 00	200 00		Office supplies, etc.	100 00	
$ 2,840 00	$ 2,840 00		Total of Vote No. 53		2,740 00
		54.	LEGAL OFFICES BRANCH.		
			Salaries:		
$ 3,120 00	$ 3,120 00		Inspector of Legal Offices	$ 3,120 00	
1,540 00	1,540 00		Clerk	1,540 00	
900 00	900 00		Stenographer	780 00	
.....	.....		Temporary assistance	50 00	
$ 5,560 00	$ 5,560 00			$ 5,490 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
1,200 00	1,200 00		Travelling expenses	1,200 00	
$ 7,360 00	$ 7,360 00		Total of Vote No. 54		7,290 00
			LAND REGISTRY OFFICES.		
		55.	KAMLOOPS.		
			Salaries:		
$ 2,820 00	$ 2,820 00		Registrar	$ 2,820 00	
1,780 00	1,780 00		Chief Clerk	1,780 00	
1,720 00	1,720 00		Surveyor	1,720 00	
1,780 00	1,780 00		Clerk	1,660 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,660 00	1,660 00		Clerk	1,540 00	
1,540 00	1,540 00		Clerk	1,452 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,497 00		Clerk	1,440 00	
1,380 00	1,380 00		Clerk	1,380 00	
1,380 00	1,400 00		Clerk	1,380 00	
1,380 00	1,380 00		Clerk	1,320 00	
1,332 00	1,357 00		Clerk	1,320 00	
1,332 00	1,332 00		Clerk	1,320 00	
1,320 00	1,320 00		Clerk	1,200 00	
1,320 00	1,345 00		Clerk	960 00	
1,320 00	1,320 00		Clerk	720 00	
$ 26,616 00	$ 26,731 00		*Carried forward*	$ 25,112 00	$ 133,838 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.					
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
			LAND REGISTRY OFFICES—*Continued.*			
		55.	KAMLOOPS—*Continued.*			
$ 26,616 00	$ 26,731 00		*Brought forward*	$ 25,112 00		$ 133,838 00
			Salaries—*Continued.*			
960 00	960 00		Stenographer	960 00		
960 00	960 00		Stenographer	.....		
960 00	960 00		Stenographer	780 00		
900 00	900 00		Stenographer	780 00		
.....	900 00		Temporary assistance	750 00		
$ 30,396 00	$ 31,411 00			$ 28,382 00		
			Expenses:			
2,500 00	4,000 00		Office supplies, etc.	3,600 00		
50 00	50 00		Travelling expenses, etc.	100 00		
1,500 00	1,500 00		Repairs to building	.....		
$ 34,446 00	$ 36,961 00		Total of Vote No. 55		$ 32,082 00	
		56.	NELSON.			
			Salaries:			
$ 2,820 00	$ 2,820 00		Registrar	$ 2,820 00		
1,680 00	1,680 00		Chief Clerk	.....		
1,720 00	1,720 00		Surveyor	1,600 00		
1,540 00	1,540 00		Clerk	1,540 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,452 00	1,452 00		Clerk	780 00		
1,080 00	1,080 00		Janitor	1,080 00		
840 00	840 00		Stenographer	840 00		
.....	.....		Temporary assistance	500 00		
$ 16,928 00	$ 16,928 00			$ 14,956 00		
			Expenses:			
1,600 00	3,100 00		Office supplies, etc.	2,750 00		
50 00	50 00		Travelling expenses, etc.	50 00		
$ 18,578 00	$ 20,078 00		Total of Vote No. 56		17,756 00	
		57.	NEW WESTMINSTER.			
			Salaries:			
$ 3,420 00	$ 3,420 00		Registrar	$ 3,420 00		
2,220 00	2,220 00		Chief Clerk	2,220 00		
1,720 00	1,720 00		Surveyor	1,600 00		
1,720 00	1,720 00		Surveyor	1,500 00		
1,660 00	1,660 00		Clerk	1,660 00		
1,660 00	1,660 00		Clerk	1,660 00		
1,600 00	1,600 00		Clerk	1,600 00		
$ 14,000 00	$ 14,000 00		*Carried forward*	$ 13,660 00	$ 49,838 00	$ 133,838 00

FISCAL YEAR, 1920–21.		No. of Vote.	SERVICE.			Fiscal Year. 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.					
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
			LAND REGISTRY OFFICES—*Continued.*			
		57.	NEW WESTMINSTER—*Continued.*			
14,000 00	$ 14,000 00		*Brought forward*	$ 13,660 00	$ 49,838 00	$ 133,838 00
			Salaries—*Continued.*			
1,600 00	1,600 00		Clerk	1,600 00		
1,600 00	1,600 00		Clerk	1,600 00		
1,500 00	1,500 00		Clerk	1,600 00		
1,500 00	1,500 00		Clerk	1,600 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,600 00	1,600 00		Clerk	1,500 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,320 00		
1,500 00	1,500 00		Clerk	1,200 00		
1,500 00	1,500 00		Clerk	1,320 00		
1,320 00	1,320 00		Clerk	.....		
1,320 00	1,320 00		Clerk	.....		
960 00	960 00		Stenographer	960 00		
960 00	960 00		Stenographer	780 00		
780 00	780 00		Stenographer	780 00		
780 00	780 00		Stenographer	780 00		
780 00	780 00		Stenographer	.....		
1,080 00	1,080 00		Janitor	1,080 00		
.....	.....		Temporary assistance	250 00		
39,848 00	$ 39,848 00			$ 35,706 00		
			Expenses:			
3,000 00	5,000 00		Office supplies, etc.	4,700 00		
100 00	100 00		Travelling expenses, etc.	100 00		
42,948 00	$ 44,948 00		Total of Vote No. 57		40,506 00	
		58.	PRINCE RUPERT.			
			Salaries:			
2,820 00	$ 2,820 00		Registrar	$ 2,820 00		
1,780 00	1,780 00		Clerk	1,780 00		
1,320 00	1,320 00		Clerk	.....		
1,020 00	1,020 00		Stenographer	1,020 00		
300 00	300 00		Surveyor	300 00		
.....	.....		Temporary assistance	200 00		
7,240 00	$ 7,240 00			$ 6,120 00		
			Expenses:			
850 00	850 00		Office supplies, etc.	850 00		
50 00	50 00		Travelling expenses, etc.	50 00		
100 00	100 00		Repairs to building	100 00		
8,240 00	$ 8,240 00		Total of Vote No. 58		7,120 00	
			Carried forward		$ 97,464 00	$ 133,838 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			LAND REGISTRY OFFICES—*Continued.*		
			Brought forward	$ 97,464 00	$ 133,838 00
		59.	VANCOUVER.		
			Salaries:		
$ 4,800 00	$ 4,800 00		Registrar	$ 4,800 00	
2,440 00	2,440 00		Chief Clerk	2,440 00	
1,800 00	1,800 00		Clerk	1,800 00	
1,900 00	1,900 00		Clerk	1,900 00	
1,780 00	1,780 00		Clerk	1,780 00	
1,780 00	1,780 00		Clerk	1,780 00	
1,780 00	1,780 00		Clerk	1,780 00	
1,720 00	1,720 00		Surveyor	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,500 00	1,500 00		Clerk	.....	
1,500 00	1,500 00		Clerk	1,600 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	.....	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,392 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	.....	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	1,500 00	
1,392 00	1,392 00		Clerk	1,392 00	
1,392 00	1,392 00		Clerk	1,392 00	
1,332 00	1,332 00		Clerk	1,332 00	
1,200 00	1,200 00		Clerk	1,200 00	
1,272 00	1,272 00		Clerk	1,272 00	
1,200 00	1,200 00		Clerk	1,200 00	
1,200 00	1,200 00		Clerk	1,200 00	
1,200 00	1,200 00		Clerk	1,200 00	
1,080 00	1,080 00		Stenographer	1,080 00	
960 00	960 00		Stenographer	900 00	
930 00	930 00		Stenographer	930 00	
900 00	900 00		Stenographer	780 00	
900 00	900 00		Stenographer	900 00	
.....	.....		Temporary assistance	1,000 00	
$ 60,710 00	$ 60,710 00		*Carried forward*	$ 57,070 00	$ 97,464 00 $ 133,838 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			LAND REGISTRY OFFICES—*Continued.*		
		59.	VANCOUVER—*Continued.*		
60,710 00	$ 60,710 00		*Brought forward*	$ 57,070 00 $ 97,464 00	$ 133,838 00
			Expenses:		
3,000 00	5,500 00		Office supplies, etc.	4,500 00	
50 00	50 00		Travelling expenses, etc.	100 00	
3,000 00	3,000 00		Furniture and vault fixtures, etc.	150 00	
66,760 00	$ 69,260 00		Total of Vote No. 59	61,820 00	
		60.	VICTORIA.		
			Salaries:		
3,720 00	$ 3,720 00		Registrar-General	$ 3,720 00	
2,440 00	2,440 00		Chief Clerk	2,100 00	
1,780 00	1,780 00		Surveyor	1,780 00	
1,720 00	1,720 00		Surveyor	1,720 00	
2,000 00	2,000 00		Clerk	.....	
1,800 00	1,800 00		Clerk	1,800 00	
1,800 00	1,800 00		Clerk	1,800 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,540 00	1,540 00		Clerk	1,540 00	
1,540 00	1,540 00		Clerk	1,540 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,332 00	1,332 00		Clerk	1,332 00	
1,332 00	1,500 00		Clerk	1,500 00	
1,200 00	1,200 00		Clerk	1,152 00	
1,200 00	1,392 00		Clerk	1,392 00	
1,200 00	1,200 00		Clerk	1,320 00	
1,152 00	1,152 00		Clerk	1,152 00	
870 00	900 00		Stenographer	900 00	
840 00	840 00		Stenographer	840 00	
720 00	720 00		Stenographer	720 00	
720 00	720 00		Stenographer	.....	
420 00	420 00		Office-boy	420 00	
$ 48,358 00	$ 48,748 00		*Carried forward*	$ 45,760 00 $159,284 00	$ 133,838 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
			LAND REGISTRY OFFICES—*Continued.*			
		60.	VICTORIA—*Continued.*			
$ 48,358 00	$ 48,748 00		*Brought forward*	$ 45,760 00	$159,284 00	$ 133,838 00
			Salaries—*Continued.*			
420 00	420 00		Office-boy	360 00		
.....	.....		Temporary assistance	500 00		
$ 48,778 00	$ 49,168 00			$ 46,620 00		
			Expenses:			
3,050 00	4,400 00		Office supplies, etc.	3,050 00		
50 00	50 00		Travelling expenses, etc.	50 00		
.....	.....		Furniture and vault fixtures	1,300 00		
$ 51,878 00	$ 53,618 00		Total of Vote No. 60		51,020 00	
$ 222,850 00	$ 233,105 00		Total, all Land Registry Offices			210,304 00
			SUPREME AND COUNTY COURTS.			
		61.	CHILLIWACK.			
			Salaries:			
$ 600 00	$ 600 00		Registrar	$ 600 00		
530 00	530 00		Janitor and temporary assistance	530 00		
$ 1,130 00	$ 1,130 00			$ 1,130 00		
			Expenses:			
125 00	125 00		Office supplies, etc.	300 00		
.....	750 00		Maintenance and repairs	.....		
175 00	175 00		Fuel, light, water, etc.	300 00		
$ 1,430 00	$ 2,180 00		Total of Vote No. 61		$ 1,730 00	
		62.	LADYSMITH.			
			Salaries:			
$ 420 00	$ 420 00		Deputy Registrar	$ 420 00		
			Expenses:			
25 00	50 00		Office supplies, etc.	25 00		
$ 445 00	$ 470 00		Total of Vote No. 62		445 00	
		63.	NELSON.			
			Salaries:			
$ 2,160 00	$ 2,160 00		Registrar	$ 2,160 00		
.....	90 00		Temporary assistance	.....		
$ 2,160 00	$ 2,250 00		*Carried forward*	$ 2,160 00	$ 2,175 00	$ 344,142 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			SUPREME AND COUNTY COURTS—*Continued.*		
		63.	NELSON—*Continued.*		
2,160 00	$ 2,250 00		*Brought forward*	$ 2,160 00	$ 2,175 00 $ 344,142 00
285 00	285 00		Expenses:		
.....	.....		Office supplies, etc.	300 00	
			Travelling expenses, etc.	20 00	
2,445 00	$ 2,535 00		Total of Vote No. 63		2,480 00
		64.	NEW WESTMINSTER.		
			Salaries:		
2,400 00	$ 2,400 00		Registrar	$ 2,400 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,392 00	1,392 00		Clerk	1,392 00	
960 00	960 00		Stenographer	960 00	
.....	.....		Temporary assistance	250 00	
6,252 00	$ 6,252 00			$ 6,502 00	
			Expenses:		
650 00	750 00		Office supplies, etc.	700 00	
6,902 00	$ 7,002 00		Total of Vote No. 64		7,202 00
		65.	PRINCE RUPERT.		
			Salaries:		
2,220 00	$ 2,220 00		Registrar	$ 2,220 00	
			Expenses:		
150 00	150 00		Office supplies, etc.	200 00	
250 00	250 00		Repairs to building	250 00	
2,620 00	$ 2,620 00		Total of Vote No. 65		2,670 00
		66.	VANCOUVER.		
			Salaries:		
3,420 00	$ 3,420 00		Registrar	$ 3,420 00	
2,280 00	2,280 00		Deputy Registrar	2,280 00	
1,800 00	1,800 00		Chief Clerk	1,800 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
20,808 00	$ 20,808 00		*Carried forward*	$ 20,808 00	$ 14,527 00 $ 344,142 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
			SUPREME AND COUNTY COURTS—*Continued.*			
		66.	VANCOUVER—*Continued.*			
$ 20,808 00	$ 20,808 00		*Brought forward*	$ 20,808 00	$ 14,527 00	$ 344,142 0
			Salaries—*Continued.*			
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,200 00	1,475 00		Clerk	1,500 00		
1,200 00	1,200 00		Clerk	.....		
1,176 00	1,176 00		Clerk	1,176 00		
960 00	1,020 00		Stenographer	1,020 00		
960 00	960 00		Stenographer	.....		
.....	.....		Temporary assistance	1,000 00		
$ 31,992 00	$ 32,327 00			$31,192 00		
			Expenses:			
1,200 00	2,950 00		Office supplies, etc.	2,000 00		
$ 33,192 00	$ 35,277 00		Total of Vote No. 66		33,192 00	
		67.	VICTORIA.			
			Salaries:			
$ 3,000 00	$ 3,000 00		Registrar	$ 3,000 00		
1,800 00	1,800 00		Deputy Registrar	1,800 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,392 00	1,455 00		Clerk	1,500 00		
1,392 00	1,455 00		Clerk	1,500 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,200 00	1,200 00		Usher and Janitor	1,200 00		
1,200 00	1,200 00		Assistant Janitor	1,200 00		
1,140 00	1,140 00		Assistant Janitor	1,140 00		
.....	1,140 00		Janitor and Fireman	1,140 00		
1,140 00	1,140 00		Elevator Attendant	1,080 00		
1,140 00	1,140 00		Nightwatchman	1,140 00		
1,200 00	1,200 00		Engineer and Janitor	1,200 00		
1,080 00	1,080 00		Clerk to Judges	900 00		
.....	450 00		Temporary assistance	750 00		
$ 21,576 00	$ 23,292 00			$ 23,442 00		
			Expenses:			
1,100 00	2,700 00		Office supplies, etc.	2,000 00		
2,500 00	2,500 00		Maintenance and repairs	2,000 00		
1,000 00	1,000 00		Fuel, light, water, etc.	1,000 00		
$ 26,176 00	$ 29,492 00		Total of Vote No. 67		28,442 00	
			Carried forward		$ 76,161 00	$ 344,142 0

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*			
			SUPREME AND COUNTY COURTS—*Continued.*			
			Brought forward		$ 76,161 00	$ 344,142 00
		68.	OFFICIAL STENOGRAPHERS.			
			Salaries:			
2,688 00	$ 2,688 00		Two Stenographers @ $1,344 each	$ 2,688 00		
300 00	300 00		One Stenographer	300 00		
3,500 00	3,500 00		Civil Court Stenographers	3,500 00		
6,488 00	$ 6,488 00			$ 6,488 00		
100 00	100 00		Expenses	700 00		
6,588 00	$ 6,588 00		Total of Vote No. 68		7,188 00	
79,798 00	$ 86,164 00		Total, all Supreme and County Courts			83,349 00
		69.	PROVINCIAL POLICE.			
			Salaries:			
230,400 00	$ 230,400 00		Police and Special Constables		$246,227 00	
			Expenses:			
14,500 00	14,500 00		Office supplies, etc.		14,000 00	
77,000 00	127,000 00		Travelling expenses, transportation, etc.		101,374 00	
2,000 00	2,000 00		Furniture and fixtures		1,500 00	
13,500 00	13,500 00		Uniforms, clothing, and equipment		10,500 00	
3,500 00	3,500 00		Rents		4,000 00	
4,500 00	4,500 00		Maintenance and repairs of buildings, grounds, etc.		6,000 00	
9,000 00	9,000 00		Fuel, light, water, etc.		10,000 00	
4,500 00	4,500 00		Provisions		5,000 00	
3,000 00	3,000 00		Incidentals and contingencies		2,000 00	
361,900 00	$ 411,900 00		Total of Vote No. 69			400,601 00
			COUNTY GAOLS.			
		70.	NELSON.			
			Salaries:			
6,120 00	$ 6,120 00		Gaol officials and sundry employees	$ 8,820 00		
			Expenses:			
200 00	200 00		Office supplies, etc.	200 00		
50 00	50 00		Travelling expenses	50 00		
100 00	100 00		Furniture and fixtures	50 00		
400 00	400 00		Uniforms, clothing, and equipment	450 00		
1,100 00	1,100 00		Maintenance and repairs of buildings, grounds, etc.	600 00		
525 00	525 00		Fuel, light, water, etc.	585 00		
1,500 00	1,500 00		Provisions, etc.	1,825 00		
9,995 00	$ 9,995 00		*Carried forward*	$ 12,580 00		$ 828,092 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			COUNTY GAOLS—*Continued.*		
		70.	NELSON—*Continued.*		
$ 9,995 00	$ 9,995 00		*Brought forward*	$ 12,580 00	$ 828,092 00
			Expenses—*Continued.*		
550 00	550 00		Medical attendance and hospital supplies	575 00	
200 00	200 00		Incidentals and contingencies	100 00	
$ 10,745 00	$ 10,745 00		Total of Vote No. 70	$ 13,255 00	
		71.	OAKALLA PRISON FARM.		
			Salaries:		
$ 32,360 00	$ 32,360 00		Gaol officials and sundry employees...	$ 40,140 00	
			Expenses:		
775 00	775 00		Office supplies, etc.	1,050 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,500 00	
500 00	500 00		Furniture and fixtures	750 00	
2,500 00	2,500 00		Uniforms, clothing, and equipment....	12,450 00	
8,200 00	8,200 00		Maintenance and repairs of buildings, grounds, etc.	10,000 00	
7,500 00	7,500 00		Fuel, light, water, etc.	7,150 00	
19,500 00	19,500 00		Provisions	30,840 00	
1,500 00	1,500 00		Medical attendance and hospital supplies	1,500 00	
500 00	500 00		Incidentals and contingencies	750 00	
$ 74,835 00	$ 74,835 00		Total of Vote No. 71	106,130 00	
$ 85,580 00	$ 85,580 00		Total, County Gaols		119,385 00
			INDUSTRIAL SCHOOLS.		
			BOYS' SCHOOL.		
			(Now transferred to the Department of The Provincial Secretary; *see* Vote No. 236.)		
$ 14,374 00	$ 14,374 00		Salaries	.....	
28,830 00	28,830 00		Expenses	.....	
$ 43,204 00	$ 43,204 00				
		72.	GIRLS' SCHOOL.		
			Salaries:		
$ 1,500 00	$ 1,500 00		Superintendent	$ 1,500 00	
900 00	900 00		Nurse and Matron	900 00	
720 00	720 00		First Assistant	720 00	
720 00	720 00		Second Assistant	720 00	
1,500 00	1,500 00		Teacher and Agricultural Instructor..	1,500 00	
720 00	720 00		Needlewoman	720 00	
$ 6,060 00	$ 6,060 00		*Carried forward*	$ 6,060 00	$ 947,477 00

Fiscal Year, 1920-21. Original Estimates approved by Legislature.	Fiscal Year, 1920-21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921-22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			INDUSTRIAL SCHOOLS—*Continued.*		
		72.	GIRLS' SCHOOL—*Continued.*		
6,060 00	$ 6,060 00		*Brought forward*	$ 6,060 00	$ 947,477 00
			Salaries—*Continued.*		
720 00	720 00		Linen-keeper	720 00	
720 00	720 00		Cook	720 00	
1,560 00	1,560 00		Engineer and Janitor	1,560 00	
1,260 00	1,260 00		Gardener	1,200 00	
.....	.....		Gardener	1,200 00	
450 00	450 00		Commercial Teacher	600 00	
150 00	150 00		Temporary assistance	300 00	
10,920 00	$ 10,920 00			$ 12,360 00	
			Expenses:		
650 00	650 00		Office supplies, etc.	650 00	
140 00	140 00		Travelling expenses, etc.	140 00	
750 00	750 00		Furniture and fixtures	750 00	
1,800 00	1,800 00		Clothing, boots, etc.	2,000 00	
4,540 00	4,540 00		Maintenance and repairs	4,500 00	
1,825 00	1,825 00		Fuel, light, water, etc.	2,000 00	
6,000 00	6,000 00		Provisions	6,000 00	
1,000 00	1,000 00		Medical attendance and hospital supplies	1,300 00	
350 00	350 00		Incidentals and contingencies	350 00	
27,975 00	$ 27,975 00		Total of Vote No. 72	$ 30,050 00	
71,179 00	$ 71,179 00		Total, Industrial Schools		30,050 00
		73.	ADMINISTRATION OF "INFANTS ACT" AND "MOTHERS' PENSIONS ACT."		
			Salaries:		
3,120 00	$ 2,700 00		Superintendent and Administrator	$ 3,000 00	
.....	4,045 00		Three Investigators @ $1,140	3,420 00	
.....	.....		Chief Clerk	1,500 00	
840 00	880 00		Stenographer	900 00	
.....	585 00		Stenographer	780 00	
.....	585 00		Clerk	780 00	
3,960 00	$ 8,795 00			$ 10,380 00	
			Expenses:		
1,500 00	4,000 00		Office supplies, etc.	3,200 00	
2,500 00	4,500 00		Travelling expenses, etc.	3,000 00	
30,000 00	30,000 00		Grants and contributions to homes, aid societies, etc.	27,000 00	
1,000 00	1,000 00		Incidentals and contingencies	100 00	
38,960 00	$ 48,295 00		Total of Vote No. 73		43,680 00
			Carried forward		$1,021,207 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			Brought forward		$1,021,207 00
		74.	ADMINISTRATION OF "MOTOR-VEHICLE ACT."		
			Salaries:		
.....	.....		Officers collecting revenue, including temporary assistance	$ 20,000 00	
			Expenses:		
			Office supplies, etc.	10,000 00	
$ 9,500 00	$ 24,500 00		Travelling expenses, etc.	250 00	
			Furniture and fixtures	750 00	
			Plates, badges, etc.	17,000 00	
$ 9,500 00	$ 24,500 00		Total of Vote No. 74		48,000 00
			PUBLIC UTILITIES COMMISSION. (Now closed.)		
$ 12,960 00	$ 12,960 00		Salaries	.....	
11,400 00	11,400 00		Expenses	.....	
$ 24,360 00	$ 24,360 00				.....
			MISCELLANEOUS VOTES.		
$ 25,000 00	$ 25,000 00	75.	Summoning and paying witnesses	$ 30,000 00	
30,000 00	30,000 00	76	Grand and Petit Jurors (including drawing panels, etc.)	27,500 00	
22,500 00	22,500 00	77.	Prosecutions and Interpreters	30,000 00	
6,000 00	6,000 00	78.	Expenses of inquests	6,500 00	
2,000 00	2,000 00	79.	Rewards	3,000 00	
10,000 00	11,000 00	80.	Constitutional litigation and general law costs	10,000 00	
		81.	Destruction of wolves, cougars, coyotes, owls, etc., and game protection, including salaries, travelling expenses, incidentals of office, publicity, and contingencies	50,000 00	
40,000 00	40,000 00				
2,500 00	2,500 00	82.	Special surveys	2,500 00	
		83.	Stipendiary Magistrates:		
			Nelson	$ 500 00	
4,000 00	4,000 00		Provisional	3,500 00	
				4,000 00	
		84.	Promotion of uniformity of Provincial legislation in Canada	1,500 00	
1,500 00	1,500 00				
.....	25,000 00	85.	"Moving Picture Act Amendment Act" (salaries and expenses)	12,500 00	
10,000 00	10,000 00	86.	Incidentals and contingencies	12,500 00	
$ 153,500 00	$ 179,500 00		Total, Miscellaneous Votes		190,000 00
			Carried forward		$1,259,207 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE ATTORNEY-GENERAL—*Continued.*		
			Brought forward		$1,259,207 00
.....	$ 245,000 00	86A.	"Mothers' Pensions Act, 1920"		400,000 00
$ 1,183,720 00	$ 1,561,466 00		Total, Department of the Attorney-General		$1,659,207 00
			DEPARTMENT OF EDUCATION.		
		87.	GENERAL OFFICE.		
			Salaries:		
$ 4,000 00	$ 4,000 00		Superintendent of Education	$ 4,000 00	
3,480 00	3,480 00		Assistant Superintendent of Education	3,600 00	
.....	.....		Assistant in Education Office	2,220 00	
2,400 00	2,400 00		Chief Clerk	2,400 00	
1,152 00	1,152 00		Clerk and Stenographer	1,152 00	
1,080 00	1,080 00		Clerk	1,080 00	
1,080 00	1,080 00		Stenographer	1,080 00	
840 00	840 00		Stenographer	840 00	
840 00	840 00		Stenographer	780 00	
1,800 00	1,800 00		Registrar	1,800 00	
500 00	500 00		Temporary assistance	400 00	
$ 17,172 00	$ 17,172 00			$ 19,352 00	
			Expenses:		
7,370 00	9,370 00		Office supplies, etc.	9,000 00	
800 00	800 00		Travelling expenses, etc.	800 00	
$ 25,342 00	$ 27,342 00		Total of Vote No. 87		$ 29,152 00
		88.	FREE TEXT-BOOK BRANCH.		
			Salaries:		
$ 2,100 00	$ 2,100 00		Officer in Charge	$ 2,100 00	
1,500 00	1,500 00		Clerk	1,500 00	
960 00	960 00		Stenographer	960 00	
840 00	870 00		Stenographer	900 00	
1,000 00	1,000 00		Temporary assistance	700 00	
$ 6,400 00	$ 6,430 00			$ 6,160 00	
			Expenses:		
2,656 00	3,456 00		Office supplies, etc.	4,000 00	
50 00	50 00		Travelling expenses	50 00	
70,000 00	77,000 00		Text-books, maps, globes, etc.	84,670 00	
$ 79,106 00	$ 86,936 00		Total of Vote No 88		94,880 00
			Carried forward		$ 124,032 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF EDUCATION—*Continued.*		
			Brought forward		$ 124,032 00
		89.	AGRICULTURAL EDUCATION.		
			Salaries:		
$ 3,420 00	$ 3,420 00		Director	$ 3,420 00	
2,320 00	2,320 00		District Supervisor	2,320 00	
4,440 00	4,440 00		Two District Supervisors	4,440 00	
2,120 00	2,120 00		District Supervisor	2,120 00	
2,120 00	2,120 00		District Supervisor	2,120 00	
2,120 00	2,120 00		District Supervisor	1,900 00	
2,020 00	2,020 00		District Supervisor	2,020 00	
1,900 00	1,900 00		District Supervisor	1,900 00	
3,600 00	3,734 00		Two District Supervisors	3,800 00	
.....	.....		District Supervisor	1,900 00	
870 00	870 00		Clerk and Stenographer	840 00	
$ 24,930 00	$ 25,064 00			$ 26,780 00	
			Expenses:		
1,000 00	1,000 00		Office supplies, etc.	1,500 00	
1,600 00	1,600 00		Travelling expenses, etc.	2,000 00	
15,000 00	15,000 00		Grants in aid of agricultural education	12,000 00	
8,000 00	8,000 00		Summer school (rural science)	7,000 00	
$ 50,530 00	$ 50,664 00			$ 49,280 00	
20,000 00	20,000 00		*Less* special grant from Dominion Government	20,000 00	
$ 30,530 00	$ 30,664 00		Total of Vote No. 89		29,280 00
		90.	INDUSTRIAL EDUCATION.		
			Salaries:		
$ 3,120 00	$ 3,120 00		Organizer	$ 3,120 00	
2,220 00	2,220 00		Officer in Charge of Correspondence Course	2,220 00	
.....	.....		Supervisor of Domestic Science	2,280 00	
.....	.....		Clerk and Stenographer	780 00	
870 00	870 00		Clerk and Stenographer	870 00	
$ 6,210 00	$ 6,210 00			$ 9,270 00	
			Expenses:		
1,000 00	1,550 00		Office supplies, etc.	2,000 00	
2,000 00	2,000 00		Travelling expenses, etc.	3,000 00	
11,500 00	11,500 00		Night-schools	12,000 00	
8,000 00	8,000 00		Summer schools	8,000 00	
			Grants in aid of industrial, commercial, and house-		
43,000 00	43,000 00		hold science education	50,000 00	
50,000 00	50,000 00		Grant in aid of Technical School Vancouver	.....	
.....	.....		Grant in aid of Technical School, New Westminster	12,000 00	
$ 121,710 00	$ 122,260 00		Total of Vote No. 90		96,270 00
			Carried forward		$ 249,582 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF EDUCATION—*Continued.*		
			Brought forward		$ 249,582 00
		91.	INSPECTION OF SCHOOLS.		
			Salaries:		
3,120 00	3,120 00		Inspector of High Schools	$ 3,240 00	
2,940 00	2,940 00		Inspector of High Schools	3,060 00	
2,880 00	2,880 00		Inspector of Schools	3,000 00	
2,820 00	2,820 00		Inspector of Schools	2,940 00	
2,820 00	2,820 00		Inspector of Schools	2,940 00	
2,760 00	2,760 00		Inspector of Schools	2,700 00	
2,760 00	2,760 00		Inspector of Schools	2,880 00	
2,640 00	2,640 00		Inspector of Schools	2,760 00	
2,640 00	2,640 00		Inspector of Schools	2,760 00	
2,640 00	2,640 00		Inspector of Schools	2,760 00	
2,640 00	2,640 00		Inspector of Schools	2,760 00	
2,580 00	2,580 00		Inspector of Schools	2,700 00	
2,520 00	2,520 00		Inspector of Schools	2,640 00	
2,460 00	2,460 00		Inspector of Schools	2,580 00	
2,400 00	2,400 00		Inspector of Schools	2,520 00	
2,280 00	2,280 00		Inspector of Schools	2,400 00	
.....	.....		Inspector of Schools	2,880 00	
.....	.....		Inspector of Schools	2,280 00	
780 00	780 00		Stenographer	780 00	
$ 43,680 00	$ 43,680 00			$ 50,580 00	
			Expenses:		
2,500 00	3,100 00		Office supplies, etc.	4,000 00	
16,000 00	19,000 00		Travelling expenses, etc.	21,000 00	
400 00	400 00		Office-rents	300 00	
$ 62,580 00	$ 66,180 00		Total of Vote No. 91		75,880 00
			NORMAL SCHOOLS.		
		92.	VANCOUVER.		
			Salaries:		
$ 3,420 00	$ 3,420 00		Principal	$ 3,420 00	
3,120 00	3,120 00		Assistant Master	3,120 00	
3,040 00	3,040 00		Assistant Master	2,520 00	
2,760 00	2,760 00		Assistant Master	2,880 00	
2,700 00	2,700 00		Assistant Master	2,820 00	
2,520 00	2,520 00		Assistant Master	2,640 00	
2,040 00	2,040 00		Assistant Master	2,160 00	
1,920 00	1,920 00		Music Mistress	2,040 00	
960 00	960 00		Librarian and Stenographer	900 00	
1,170 00	1,170 00		Engineer and Janitor	1,170 00	
1,110 00	1,110 00		Assistant Janitor	1,110 00	
$ 24,760 00	$ 24,760 00		*Carried forward*	$ 24,780 00	$ 325,462 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF EDUCATION—*Continued.*			
			NORMAL SCHOOLS—*Continued.*			
		92.	VANCOUVER—*Continued.*			
$ 24,760 00	$ 24,760 00		*Brought forward*	$ 24,780 00		$ 325,462 00
			Salaries—*Continued.*			
1,170 00	1,170 00		Gardener	1,170 00		
1,110 00	1,110 00		Assistant Gardener	1,110 00		
$ 27,040 00	$ 27,040 00			$ 27,060 00		
			Expenses:			
2,500 00	2,500 00		Office supplies, etc.	3,000 00		
50 00	50 00		Travelling expenses, etc.	850 00		
2,000 00	2,000 00		Fuel, light, water, etc.	2,000 00		
2,000 00	2,000 00		Maintenance and repairs of buildings, grounds, etc.	2,550 00		
2,000 00	3,800 00		Students' mileage	2,800 00		
1,200 00	1,200 00		Allowance to teachers assisting Normal students	1,200 00		
$ 36,790 00	$ 38,590 00		Total of Vote No. 92		$ 39,460 00	
		93.	VICTORIA.			
			Salaries:			
$ 3,420 00	$ 3,420 00		Principal	$ 3,540 00		
2,880 00	2,880 00		Assistant Master	3,000 00		
2,820 00	2,820 00		Assistant Master	2,940 00		
2,520 00	2,520 00		Assistant Master	2,640 00		
1,800 00	1,800 00		Domestic Science Mistress	1,920 00		
1,680 00	1,680 00		Music Mistress	960 00		
.....	.....		Assistant Mistress (Primary Specialist)	2,280 00		
1,800 00	1,800 00		Principal, Model School	1,920 00		
1,440 00	1,440 00		Teacher, Model School	1,560 00		
1,560 00	1,560 00		Engineer	1,560 00		
1,320 00	1,320 00		Assistant Engineer	1,320 00		
1,170 00	1,170 00		Janitor	1,170 00		
780 00	865 00		Stenographer and Librarian	900 00		
$ 23,190 00	$ 23,275 50			$ 25,710 00		
			Expenses:			
2,475 00	2,475 00		Office supplies, etc.	2,825 00		
100 00	100 00		Travelling expenses, etc.	900 00		
2,150 00	2,150 00		Fuel, light, water, etc.	2,720 00		
4,750 00	6,750 00		Maintenance and repairs of buildings, grounds, etc.	5,750 00		
5,000 00	5,000 00		Students' mileage	4,000 00		
$ 37,665 00	$ 39,750 50		*Carried forward*	$ 41,905 00	$ 39,460 00	$ 325,462 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF EDUCATION—*Continued.*			
			NORMAL SCHOOLS—*Continued.*			
		93.	VICTORIA—*Continued.*			
37,665 00	$ 39,750 50		*Brought forward*	$ 41,905 00	$ 39,460 00	$ 325,462 00
			Expenses—*Continued.*			
850 00	850 00		Allowance to teachers assisting Normal students	850 00		
100 00	100 00		Incidentals	100 00		
$ 38,615 00	$ 40,700 50		Total of Vote No. 93		42,855 00	
$ 75,405 00	$ 79,290 50		Total, Normal Schools			82,315 00
		94.	DEAF, DUMB, AND BLIND.			
			Salaries:			
			Principal and staff, including household assistance		$ 17,000 00	
			Expenses:			
			Office supplies, etc.		1,000 00	
			Travelling expenses, etc.		1,500 00	
$ 40,000 00	$ 40 000 00		Fuel, light, water, etc.		2,600 00	
			Maintenance and repairs of buildings, grounds, etc.		3,000 00	
			Furniture, fixtures, and equipment		5,000 00	
			Provisions, etc.		9,000 00	
			Education of blind children		8,000 00	
			Incidentals and contingencies		500 00	
$ 40,000 00	$ 40 000 00		Total of Vote No. 94			47,600 00
			PER CAPITA GRANTS.			
$ 616,000 00	$ 616,000 00	95.	Cities		$670,000 00	
385,000 00	385,000 00	96.	Municipalities		400,000 00	
137,500 00	137,500 00	97.	Rural school districts		137,500 00	
$ 1,138,500 00	$ 1,138,500 00		Total, Per Capita Grants			1,207,500 00
			TEACHERS' SALARIES.			
$ 422,000 00	$ 422,000 00	98.	Assisted schools (as per Schedule)		$460,000 00	
92,340 00	92,340 00	99.	E. & N. Railway Belt (as per Schedule)		100,000 00	
$ 514,340 00	$ 514,340 00		Total, Teachers' Salaries			560,000 00
		100.	SCHOOL BUILDINGS.			
$ 320,000 00	$ 380,000 00		Erection of new buildings and maintenance and repairs of school buildings and special aid to districts			400,000 00
			Carried forward			$2,622,877 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF EDUCATION—*Continued.*		
			Brought forward		$2,622,877 0
			MISCELLANEOUS VOTES.		
$ 1,000 00	$ 1,000 00	101.	Grants to libraries	$ 1,500 00	
2,000 00	2,000 00	102.	Grants in aid of manual-training equipment, High School laboratories, etc.	3,000 00	
17,500 00	18,750 00	103.	Examination of teachers and High School Entrance classes	20,000 00	
8,000 00	11,000 00	104.	Conveying children to central schools	12,000 00	
3,600 00	3,600 00	105.	Scholarships for British Columbia students for post-graduate study in France	3,600 00	
.....	.....	105A.	Miscellaneous grants to Frontier College, Hands Across the Seas movement, etc.	5,000 00	
5,000 00	5,000 00	106.	Incidentals and contingencies	5,250 00	
$ 37,100 00	$ 41,350 00		Total, Miscellaneous Votes		50,350 0
$ 420,000 00	$ 420,000 00	107.	Grant to University of British Columbia		445,000 0
.....	$ 300,000 00	107A.	Rural district school taxes, sec. 26, "Public Schools Act Amendment Act," chap. 74, 1918		300,000 0
$ 2,864,613 00	$ 3,246,862 50		Total for Educational Purposes		$3,418,227 0
			DEPARTMENT OF FINANCE.		
		108.	MINISTER'S OFFICE.		
			Salaries:		
$ 6,000 00	$ 6,000 00		Minister of Finance	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
960 00	960 00		Clerk and Stenographer	1,080 00	
$ 9,000 00	$ 9,000 00			$ 9,120 00	
700 00	700 00		Expenses:		
2,500 00	2,500 00		Office supplies, etc.	700 00	
			Travelling expenses	3,000 00	
$ 12,200 00	$ 12,200 00				
			Total of Vote No. 108		$ 12,820 0
		109.	GENERAL OFFICE.		
			Salaries:		
$ 4,320 00	$ 4,320 00		Deputy Minister	$ 4,320 00	
3,300 00	3,300 00		Asst. Deputy Minister and Inspector of Revenue	3,300 00	
2,400 00	2,400 00		Chief Clerk	2,400 00	
$ 10,020 00	$ 10,020 00		*Carried forward*	$ 10,020 00	$ 12,820 0

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF FINANCE—*Continued.*		
		109.	GENERAL OFFICE—*Continued.*		
10,020 00	$ 10,020 00		*Brought forward*	$ 10,020 00	$ 12,820 00
			Salaries—*Continued.*		
2,220 00	2,220 00		Clerk	2,220 00	
1,920 00	1,920 00		Cashier	1,920 00	
1,800 00	1,800 00		Clerk	1,800 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,020 00	1,020 00		Clerk	1,080 00	
900 00	900 00		Stenographer	960 00	
.....	.....		Junior Clerk	900 00	
22,236 00	$ 22,236 00			$ 23,256 00	
			Expenses:		
7,470 00	7,470 00		Office supplies, printing of bonds, etc.	11,690 00	
2,450 00	2,450 00		Discount and exchange, legal expenses, etc.	2,850 00	
$ 32,156 00	$ 32,156 00		Total of Vote No. 109		37,796 00
		110.	INSPECTOR OF TRUST COMPANIES, PROBATE AND SUCCESSION DUTIES.		
			Salaries:		
$ 2,550 00	$ 2,550 00		Inspector of Trust Companies and Real-estate Agents	$ 2,670 00	
.....	.....		Assistant Inspector of Trust Companies and Real-estate Agents	2,000 00	
1,800 00	1,800 00		Clerk	.....	
900 00	900 00		Stenographer	960 00	
1,200 00	1,200 00		Temporary assistance	500 00	
$ 6,450 00	$ 6,450 00			$ 6,130 00	
			Expenses:		
1,375 00	1,375 00		Office supplies, etc.	200 00	
7,500 00	7,500 00		Valuators of Estates	7,500 00	
500 00	500 00		Travelling expenses, real estate and trust companies	1,000 00	
$ 15,825 00	$ 15,825 00		Total of Vote No. 110		14,830 00
		111.	CONTROLLING AND AUDIT BRANCH.		
			Salaries:		
$ 6,000 00	$ 6,000 00		Comptroller-General	$ 6,000 00	
3,000 00	3,000 00		Deputy Comptroller-General	3,120 00	
1,900 00	1,900 00		Accountant	1,900 00	
960 00	960 00		Secretary	1,080 00	
2,640 00	2,640 00		Auditor of Revenue	2,640 00	
1,920 00	1,920 00		Travelling Auditor	2,040 00	
1,920 00	1,920 00		Travelling Auditor	1,920 00	
$ 18,340 00	$ 18,340 00		*Carried forward*	$ 18,700 00	$ 65,446 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
		111.	CONTROLLING AND AUDIT BRANCH—*Continued.*		
$ 18,340 00	$ 18,340 00		*Brought forward*	$ 18,700 00	$ 65,446 (
			Salaries—*Continued.*		
1,800 00	1,800 00		Travelling Auditor	.....	
840 00	840 00		Stenographer	840 00	
2,640 00	2,640 00		Auditor of Disbursements	2,640 00	
1,900 00	1,900 00		Chief Clerk	1,900 00	
3,600 00	3,600 00		Two Clerks @ $1,800 each	3,600 00	
.....	.....		Clerk	1,800 00	
4,980 00	4,980 00		Three Clerks @ $1,660 each	4,980 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,380 00	1,380 00		Clerk	1,380 00	
840 00	840 00		Junior Clerk	840 00	
1,800 00	1,800 00		Two Stenographers @ $900 each	1,800 00	
3,240 00	3,240 00		Purchasing Agent	3,360 00	
2,100 00	2,100 00		Assistant Purchasing Agent	2,220 00	
1,500 00	1,500 00		Clerk	1,500 00	
870 00	900 00		Stenographer	900 00	
$ 47,330 00	$ 47,360 00			$ 47,960 00	
			Expenses:		
1,370 00	1,370 00		Office supplies, etc.	1,610 00	
3,200 00	3,230 00		Travelling expenses, etc.	4,150 00	
$ 51,900 00	$ 51,960 00		Total of Vote No. 111		53,720 (
		112.	SURVEYOR OF TAXES.		
			Salaries:		
$ 3,300 00	$ 3,300 00		Surveyor of Taxes	$ 3,420 00	
3,000 00	3,000 00		Assistant Surveyor of Taxes	3,120 00	
2,100 00	2,100 00		Supervisor	2,400 00	
1,720 00	1,720 00		Chief Clerk	1,720 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
.....	.....		Clerk	1,272 00	
840 00	840 00		Clerk and Stenographer	960 00	
840 00	840 00		Stenographer	840 00	
780 00	780 00		Stenographer	780 00	
2,000 00	2,000 00		Temporary assistance	2,000 00	
$ 19,080 00	$ 19,080 00			$ 21,012 00	
			Expenses:		
9,000 00	9,000 00		Office supplies, etc.	5,000 00	
1,500 00	1,500 00		Travelling expenses, etc.	2,500 00	
30,000 00	30,000 00		Special Auditors, salaries and expenses	35,000 00	
$ 59,580 00	$ 59,580 00		*Carried forward*	$ 63,512 00	$ 119,166 (

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
		112.	SURVEYOR OF TAXES—*Continued.*		
59,580 00	$ 59,580 00		*Brought forward*	$ 63,512 00	$ 119,166 00
			Expenses—*Continued.*		
.....	.....		Taxation Department supplies	5,000 00	
3,000 00	3,000 00		Courts of Revision and Appeal	3,000 00	
35,000 00	35,000 00		Timber-cruising, equalization, etc.	35,000 00	
16,000 00	16,000 00		Commission on collection of general revenue	15,000 00	
113,580 00	$ 113,580 00		Total of Vote No. 112		121,512 00
		113.	OPERATION OF THE "AMUSEMENTS TAX ACT."		
			Salaries:		
1,392 00	$ 1,392 00		Inspector, Mainland	$ 1,800 00	
1,272 00	1,272 00		Inspector, Vancouver Island	1,800 00	
600 00	600 00		Censor, allowances as Collector	.....	
750 00	750 00		Clerk (half-salary)	.....	
600 00	600 00		Temporary assistance, etc.	600 00	
4,614 00	$ 4,614 00			$ 4,200 00	
			Expenses:		
1,620 00	1,620 00		Office supplies, etc.	1,620 00	
400 00	400 00		Travelling expenses, etc.	500 00	
6,634 00	$ 6,634 00		Total of Vote No. 113		6,320 00
		114.	BUREAU OF INFORMATION.		
			Salaries:		
2,400 00	$ 2,400 00		Secretary	$ 2,400 00	
1,800 00	1,800 00		Clerk	1,800 00	
900 00	900 00		Junior Clerk	.....	
.....	.....		Clerk	1,500 00	
1,392 00	1,392 00		Clerk	1,392 00	
780 00	780 00		Stenographer	780 00	
7,272 00	$ 7,272 00			$ 7,872 00	
			Expenses:		
500 00	500 00		Office supplies, etc.	1,000 00	
25,000 00	25,000 00		Pamphlets, advertising	25,000 00	
.....	.....		Travelling expenses	1,000 00	
32,772 00	$ 32,772 00		Total of Vote No. 114		34,872 00
		115.	AGENT-GENERAL'S OFFICE, LONDON, ENGLAND.		
			Salaries:		
8,000 00	$ 8,000 00		Agent-General	$ 8,000 00	
3,900 00	3,900 00		Secretary	3,900 00	
1,500 00	1,500 00		Private Secretary	1,500 00	
13,400 00	$ 13,400 00		*Carried forward*	$ 13,400 00	$ 281,870 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
		115.	AGENT-GENERAL'S OFFICE, LONDON, ENGLAND—*Continued.*			
$ 13,400 00	$ 13,400 00		*Brought forward*		$ 13,400 00	$ 281,870
			Salaries—*Continued.*			
630 52	630 52		Clerk		756 60	
409 88	409 88		Clerk		409 88	
441 36	441 36		Office Boy		504 40	
974 20	974 20		Stenographer		974 20	
756 60	756 60		Stenographer		.....	
567 48	567 48		Stenographer		630 52	
419 96	419 96		Temporary assistance		324 40	
2,000 00	2,000 00		Difference in rate of exchange		.....	
$ 19,600 00	$ 19,600 00				$ 17,000 00	
			Expenses:			
$ 4,300 00	$ 4,300 00		Office supplies, etc.	$ 4,450 00		
1,750 00	1,750 00		Allowance, travelling and other expenses	1,750 00		
3,500 00	3,500 00		Advertising	3,500 00		
$ 9,550 00	$ 9,550 00				9,700 00	
			British Columbia House, London:			
$ 12,125 00	$ 12,125 00		Interest on mortgage	$ 12,125 00		
12,125 00	12,125 00		Ground-rent	12,125 00		
16,500 00	16,500 00		Rates and taxes	16,000 00		
4,000 00	4,000 00		Income-tax	.....		
1,500 00	1,500 00		Maintenance and repairs to building	3,000 00		
350 00	350 00		Insurance	350 00		
2,700 00	2,700 00		Fuel and light, etc.	3,000 00		
5,000 00	5,000 00		Cleaning and Janitors' supplies	5,000 00		
1,000 00	1,000 00		Contingencies	1,000 00		
$ 55,300 00	$ 55,300 00				52,600 00	
$ 84,450 00	$ 84,450 00		Total of Vote No. 115			79,300 00
			GOVERNMENT AGENTS AND ASSESSORS, ETC.			
		116.	ALBERNI AGENCY.			
			Salaries:			
$ 2,020 00	$ 2,020 00		Government Agent	$ 2,020 00		
1,800 00	1,800 00		Assessor	1,800 00		
1,500 00	1,500 00		Clerk and Registrar, County Court	1,500 00		
1,452 00	1,452 00		Clerk	1,452 00		
780 00	780 00		Stenographer	780 00		
540 00	540 00		Janitor	540 00		
$ 8,092 00	$ 8,092 00		*Carried forward*	$ 8,092 00		$ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*		
		116.	ALBERNI AGENCY—*Continued.*		
8,092 00	$ 8,092 00		*Brought forward*	$ 8,092 00	$ 361,170 00
1,500 00	1,500 00		Expenses (including $150, repairs to building)	1,760 00	
9,592 00	$ 9,592 00		Total of Vote No. 116		$ 9,852 00
		117.	ANYOX AGENCY.		
			Salaries:		
1,800 00	$ 1,800 00		Government Agent	$ 1,800 00	
900 00	900 00		Stenographer	960 00	
2,700 00	$ 2,700 00			$ 2,760 00	
1,000 00	1,000 00		Expenses	1,050 00	
3,700 00	$ 3,700 00		Total of Vote No. 117		3,810 00
		118.	ASHCROFT AGENCY.		
			Salaries:		
1,800 00	$ 1,800 00		Government Agent	$ 1,800 00	
1,500 00	1,800 00		Assessor	1,800 00	
1,452 00	1,452 00		Clerk	1,392 00	
500 00	500 00		Temporary assistance	500 00	
5,252 00	$ 5,552 00			$ 5,492 00	
2,258 00	2,258 00		Expenses (including repairs and rental of building)	4,091 00	
7,510 00	$ 7,810 00		Total of Vote No. 118		9,583 00
		119.	ATLIN AGENCY.		
			Salaries:		
2,400 00	$ 2,400 00		Government Agent	$ 2,400 00	
1,800 00	1,800 00		Assessor	1,800 00	
1,800 00	1,800 00		Clerk	1,800 00	
1,080 00	1,080 00		Stenographer	1,080 00	
730 00	730 00		Janitor and Nightwatchman	730 00	
500 00	500 00		Temporary assistance	600 00	
8,310 00	$ 8,310 00			$ 8,410 00	
4,660 00	4,660 00		Expenses (including $250, repairs to building)	4,065 00	
12,970 00	$ 12,970 00		Total of Vote No. 119		12,475 00
			Carried forward		$ 35,720 00 $ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*		
			Brought forward	$ 35,720 00	$ 361,17
		120.	BARKERVILLE SUB-AGENCY.		
			Salaries:		
$ 1,900 00	$ 1,900 00		Gold Commissioner and Mining Recorder	$ 1,900 00	
840 00	840 00		Stenographer	840 00	
$ 2,740 00	$ 2,740 00			$ 2,740 00	
1,608 00	1,608 00		Expenses (including $1,250, repairs to building)	1,982 50	
$ 4,348 00	$ 4,348 00		Total of Vote No. 120		4,722 50
		121.	CLINTON AGENCY.		
			Salaries:		
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
1,500 00	1,500 00		Clerk	1,500 00	
900 00	900 00		Stenographer	900 00	
300 00	300 00		Temporary assistance	300 00	
$ 4,800 00	$ 4,800 00			$ 4,800 00	
1,943 00	1,943 00		Expenses (including $500, repairs to building)	2,333 00	
$ 6,743 00	$ 6,743 00		Total of Vote No. 121		7,133 00
		122.	CRANBROOK AGENCY.		
			Salaries:		
$ 2,340 00	$ 2,340 00		Government Agent	$ 2,340 00	
1,800 00	1,800 00		Assessor	1,800 00	
1,720 00	1,720 00		Clerk and Registrar	1,720 00	
1,540 00	1,540 00		Clerk	.....	
1,500 00	1,500 00		Clerk	1,500 00	
1,080 00	1,080 00		Clerk	.....	
930 00	1,020 00		Cashier and Clerk	1,020 00	
.....	.....		Stenographer	840 00	
.....	.....		Junior Clerk	780 00	
1,080 00	1,080 00		Janitor	1,080 00	
$ 11,990 00	$ 12,080 00			$ 11,080 00	
3,063 00	3,063 00		Expenses (including $200, repairs to building)	3,235 00	
$ 15,053 00	$ 15,143 00		Total of Vote No. 122		14,315 00
			Carried forward	$ 61,890 50	$ 361,1

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*		
			Brought forward	$ 61,890 50	$ 361,170 00
		123.	CUMBERLAND AGENCY.		
			Salaries:		
2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
1,800 00	1,800 00		Assessor	1,800 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,392 00	1,392 00		Clerk	1,392 00	
780 00	780 00		Stenographer	780 00	
7,572 00	$ 7,572 00			$ 7,572 00	
2,048 00	2,048 00		Expenses (including $300, repairs to building)	3,467 50	
9,620 00	$ 9,620 00		Total of Vote No. 123		11,039 50
		124.	DUNCAN AGENCY.		
			Salaries:		
2,020 00	$ 2,020 00		Government Agent	$ 2,100 00	
1,800 00	1,800 00		Assessor	.....	
1,192 00	1,192 00		Clerk	1,192 00	
.....	.....		Clerk	1,200 00	
870 00	870 00		Clerk and Stenographer	870 00	
300 00	300 00		Temporary assistance	.....	
6,182 00	$ 6,182 00			$ 5,362 00	
1,524 00	1,524 00		Expenses (including $2,200, repairs to building)	3,653 00	
7,706 00	$ 7,706 00		Total of Vote No. 124		9,015 00
		125.	FAIRVIEW AGENCY.		
			Salaries:		
2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
1,800 00	1,800 00		Assessor	.....	
1,500 00	1,500 00		Clerk	1,500 00	
780 00	780 00		Junior Clerk	780 00	
6,180 00	$ 6,180 00			$ 4,380 00	
2,035 00	2,035 00		Expenses (including $150, repairs to building)	2,065 00	
8,215 00	$ 8,215 00		Total of Vote No. 125		6,445 00
			Carried forward		$ 88,390 00 $ 361,170 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Yea 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
			Brought forward		$ 88,390 00	$ 361,170
		126.	FERNIE AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,452 00	1,452 00		Clerk	1,452 00		
780 00	780 00		Stenographer	780 00		
1,080 00	1,080 00		Janitor	1,080 00		
$ 6,912 00	$ 6,912 00			$ 6,912 00		
1,310 00	1,310 00		Expenses (including $600, repairs to building)	2,802 00		
$ 8,222 00	$ 8,222 00		Total of Vote No. 126		9,714 00	
		127.	FORT FRASER AGENCY.			
			Salaries:			
$ 1,720 00	$ 1,720 00		Government Agent	$ 1,720 00		
1,332 00	1,332 00		Clerk	1,332 00		
$ 3,052 00	$ 3,052 00			$ 3,052 00		
1,153 00	1,153 00		Expenses (including $600, repairs to buildings and grounds)	1,705 00		
$ 4,205 00	$ 4,205 00		Total of Vote No. 127		4,757 00	
		128.	FORT GEORGE AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00		
1,600 00	1,600 00		Clerk and Mining Recorder	.....		
1,392 00	1,392 00		Clerk	1,392 00		
1,332 00	1,332 00		Clerk	1,332 00		
1,332 00	1,332 00		Clerk	1,272 00		
720 00	720 00		Janitor	720 00		
$ 8,476 00	$ 8,476 00			$ 6,816 00		
3,070 00	3,070 00		Expenses (including $500, repairs to buildings)	3,107 50		
$ 11,546 00	$ 11,546 00		Total of Vote No. 128		9,923 50	
		129.	GOLDEN AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 1,920 00		
1,800 00	1,800 00		Assessor	1,800 00		
1,600 00	1,600 00		Clerk	.....		
$ 5,500 00	$ 5,500 00		*Carried forward*	$ 3,720 00	$112,784 50	$ 361,170

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
		129.	GOLDEN AGENCY—*Continued.*			
5,500 00	$ 5,500 00		*Brought forward*	$ 3,720 00	$112,784 50	$ 361,170 00
			Salaries—*Continued.*			
780 00	780 00		Stenographer	780 00		
.....	.....		Clerk	1,272 00		
900 00	900 00		Janitor	900 00		
720 00	720 00		Junior Clerk	.....		
.....	.....		Temporary assistance	200 00		
7,900 00	$ 7,900 00			$ 6,872 00		
2,340 00	2,340 00		Expenses (including $500, repairs to building)	2,976 60		
10,240 00	$ 10,240 00		Total of Vote No. 129		9,848 60	
		130.	GRAND FORKS AGENCY.			
			Salaries:			
2,020 00	$ 2,020 00		Government Agent	$ 2,020 00		
1,500 00	1,500 00		Clerk	1,500 00		
960 00	960 00		Janitor	960 00		
4,480 00	$ 4,480 00			$ 4,480 00		
1,520 00	1,520 00		Expenses (including $300, repairs to building)	1,814 00		
$ 6,000 00	$ 6,000 00		Total of Vote No. 130		6,294 00	
		131.	GREENWOOD AGENCY.			
			Salaries:			
2,020 00	$ 2,020 00		Government Agent	$ 2,020 00		
1,500 00	1,500 00		Clerk and Janitor	1,500 00		
3,520 00	$ 3,520 00			$ 3,520 00		
1,480 00	1,480 00		Expenses (including $150, repairs to building)	1,780 00		
$ 5,000 00	$ 5,000 00		Total of Vote No. 131		5,300 00	
		132.	KAMLOOPS AGENCY.			
			Salaries:			
2,340 00	$ 2,340 00		Government Agent	$ 2,340 00		
1,920 00	1,920 00		Assessor	1,920 00		
1,600 00	1,600 00		Clerk and Deputy Registrar	1,600 00		
1,452 00	1,452 00		Clerk	1,452 00		
7,312 00	$ 7,312 00		*Carried forward*	$ 7,312 00	$134,227 10	$ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
		132.	KAMLOOPS AGENCY—*Continued.*			
$ 7,312 00	$ 7,312 00		*Brought forward*	$ 7,312 00	$134,227 10	$ 361,170 00
			Salaries—*Continued.*			
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,392 00		
960 00	960 00		Stenographer	960 00		
1,080 00	1,080 00		Janitor	1,080 00		
.....	.....		Junior Clerk	720 00		
300 00	300 00		Temporary assistance	300 00		
$ 12,436 00	$ 12,436 00			$ 13,156 00		
4,115 00	4,115 00		Expenses (including $625, repairs to building)	6,130 00		
$ 16,551 00	$ 16,551 00		Total of Vote No. 132		19,286 00	
		133.	KASLO AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00		
1,920 00	1,920 00		Assessor	1,920 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,080 00	1,080 00		Clerk	1,080 00		
1,080 00	1,080 00		Stenographer	1,080 00		
1,080 00	1,080 00		Janitor	1,080 00		
$ 10,104 00	$ 10,104 00			$ 10,104 00		
2,913 00	2,913 00		Expenses (including $250, repairs to buildings)	3,470 00		
$ 13,017 00	$ 13,017 00		Total of Vote No. 133		13,574 00	
		134.	LILLOOET SUB-AGENCY.			
			Salaries:			
$ 1,800 00	$ 1,800 00		Assessor	$ 1,800 00		
2,020 00	2,020 00		Mining Recorder	2,020 00		
1,332 00	1,332 00		Clerk	1,332 00		
$ 5,152 00	$ 5,152 00			$ 5,152 00		
1,370 00	1,370 00		Expenses (including $150, repairs to buildings)	2,498 75		
$ 6,522 00	$ 6,522 00		Total of Vote No. 134		7,650 75	
		135.	MERRITT AGENCY.			
			Salaries:			
$ 2,020 00	$ 2,020 00		Government Agent	$ 2,020 00		
1,800 00	1,800 00		Assessor	1,800 00		
$ 3,820 00	$ 3,820 00		*Carried forward*	$ 3,820 00	$174,737 85	$ 361,170 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*		
		135.	MERRITT AGENCY—*Continued.*		
$ 3,820 00	$ 3,820 00		*Brought forward*	$ 3,820 00	$174,737 85 $ 361,170 00
			Salaries—*Continued.*		
1,600 00	1,600 00		Clerk	1,600 00	
1,392 00	1,392 00		Clerk	1,392 00	
780 00	780 00		Stenographer	780 00	
1,020 00	1,020 00		Janitor	1,020 00	
$ 8,612 00	$ 8,612 00			$ 8,612 00	
1,130 00	1,130 00		Expenses	1,184 00	
$ 9,742 00	$ 9,742 00		Total of Vote No. 135		9,796 00
		136.	NANAIMO AGENCY.		
			Salaries:		
$ 2,252 00	$ 2,252 00		Government Agent	$ 2,252 00	
2,040 00	2,040 00		Assessor	2,040 00	
1,272 00	1,500 00		Deputy Collector	1,500 00	
1,272 00	1,272 00		Clerk	1,272 00	
1,600 00	1,600 00		Special Tax-collector	1,600 00	
960 00	1,080 00		Clerk	1,080 00	
780 00	780 00		Stenographer	780 00	
.....	.....		Stenographer	780 00	
1,140 00	1,140 00		Janitor and Messenger	1,140 00	
600 00	600 00		Temporary assistance	.....	
11,916 00	$ 12,264 00			$ 12,444 00	
5,634 00	5,634 00		Expenses (including $500, repairs to building)	4,713 00	
17,550 00	$ 17,898 00		Total of Vote No. 136		17,157 00
		137.	NELSON AGENCY.		
			Salaries:		
2,400 00	$ 2,400 00		Government Agent	$ 2,400 00	
1,980 00	1,980 00		Assessor	1,980 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,392 00	1,392 00		Clerk	1,392 00	
1,452 00	1,452 00		Clerk	1,452 00	
780 00	780 00		Stenographer	780 00	
780 00	780 00		Stenographer	780 00	
1,080 00	1,080 00		Janitor	1,080 00	
11,364 00	$ 11,364 00		*Carried forward*	$ 11,364 00	$201,690 85 $ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
		137.	NELSON AGENCY—*Continued.*			
$ 11,364 00	$ 11,364 00		*Brought forward*	$ 11,364 00	$201,690 85	$ 361,170 00
			Salaries—*Continued.*			
.....	.....		Junior Clerk	780 00		
200 00	200 00		Temporary assistance	500 00		
$ 11,564 00	$ 11,564 00			$ 12,644 00		
4,445 00	4,445 00		Expenses (including $500, repairs to building)	4,340 00		
$ 16,009 00	$ 16,009 00		Total of Vote No. 137		16,984 00	
		138.	NEW WESTMINSTER AGENCY.			
			Salaries:			
$ 2,400 00	$ 2,400 00		Government Agent	$ 2,400 00		
2,100 00	2,100 00		Assessor	2,100 00		
1,800 00	1,800 00		Gold Commissioner and Mining Recorder	1,800 00		
.....	1,800 00		Collector	1,800 00		
1,452 00	1,452 00		Clerk	1,452 00		
960 00	960 00		Stenographer	960 00		
1,500 00	1,500 00		Chief Clerk	.....		
1,700 00	1,700 00		Special Tax-collector	1,700 00		
1,500 00	1,500 00		Clerk	.....		
1,272 00	1,272 00		Clerk	1,272 00		
.....	.....		Clerk	1,272 00		
.....	.....		Stenographer	780 00		
1,380 00	1,380 00		Chief Janitor	1,380 00		
1,140 00	1,140 00		Janitor	1,140 00		
1,020 00	1,020 00		Nightwatchman	1,020 00		
300 00	300 00		Temporary assistance	300 00		
$ 18,524 00	$ 20,324 00			$ 19,376 00		
6,791 00	6,791 00		Expenses (including $300, repairs to buildings)	6,786 94		
$ 25,315 00	$ 27,115 00		Total of Vote No. 138		26,162 94	
		139.	NEW DENVER SUB-AGENCY.			
			Salaries:			
$ 1,720 00	$ 1,720 00		Mining Recorder	$ 1,720 00		
734 00	734 00		Expenses (including $500, repairs to building)	1,190 00		
$ 2,454 00	$ 2,454 00		Total of Vote No. 139		2,910 00	
			Carried forward		$247,747 79	$ 361,170 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
			Brought forward		$247,747 79	$ 361,170 00
			NICOLA AGENCY.			
$ 300 00	$ 300 00		Caretaker for vacant building			
		140.	150-MILE HOUSE AGENCY.			
			Salaries:			
$ 1,720 00	$ 1,720 00		Government Agent	$ 1,720 00		
1,500 00	1,500 00		Assessor	.....		
1,380 00	1,500 00		Clerk	1,500 00		
600 00	600 00		Temporary assistance	.....		
.....	.....		Clerk	1,320 00		
$ 5,200 00	$ 5,320 00			$ 4,540 00		
1,200 00	1,200 00		Expenses (including $35, repairs to building)	1,800 00		
$ 6,400 00	$ 6,520 00		Total of Vote No. 140		6,340 00	
		141.	POUCE COUPE AGENCY.			
			Salaries:			
$ 1,920 00	$ 1,920 00		Government Agent, $1,800; living allowance, $120	$ 1,920 00		
1,740 00	1,740 00		Deputy Assessor, $1,620; living allowance, $120	1,740 00		
1,500 00	1,500 00		Clerk, $1,380; living allowance, $120..	1,500 00		
$ 5,160 00	$ 5,160 00			$ 5,160 00		
1,600 00	1,600 00		Expenses (including $300, repairs to building)	1,840 00		
$ 6,760 00	$ 6,760 00		Total of Vote No. 141		7,000 00	
		142.	PRINCE RUPERT AGENCY.			
			Salaries:			
$ 2,340 00	$ 2,340 00		Government Agent	$ 2,340 00		
2,160 00	2,160 00		Assessor	2,160 00		
2,020 00	2,020 00		Mining Recorder	2,020 00		
1,452 00	1,452 00		Clerk and Stenographer	1,452 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,392 00		Clerk	1,392 00		
.....	.....		Stenographer	900 00		
1,700 00	1,800 00		Collector	1,800 00		
1,500 00	1,500 00		Clerk	.....		
$ 13,956 00	$ 14,056 00		*Carried forward*	$ 13,456 00	$261,087 79	$ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS, ETC.—*Continued.*			
		142.	PRINCE RUPERT AGENCY—*Continued.*			
$ 13,956 00	$ 14,056 00		*Brought forward*	$ 13,456 00	$261,087 79	$ 361,170 00
			Salaries—*Continued.*			
1,500 00	1,560 00		Clerk	1,560 00		
1,320 00	1,320 00		Clerk	1,320 00		
1,020 00	1,020 00		Stenographer	1,020 00		
1,140 00	1,140 00		Janitor	1,140 00		
660 00	660 00		Assistant Janitor	660 00		
900 00	900 00		Temporary assistance	600 00		
$ 20,496 00	$ 20,656 00			$ 19,756 00		
7,930 00	7,930 00		Expenses (including $1,500, repairs and maintenance to building)	10,080 00		
$ 28,426 00	$ 28,586 00		Total of Vote No. 142		29,836 00	
		143.	PRINCETON AGENCY.			
			Salaries:			
$ 2,020 00	$ 2,020 00		Government Agent	$ 2,020 00		
1,392 00	1,392 00		Clerk	1,392 00		
720 00	720 00		Temporary assistance	1,200 00		
$ 4,132 00	$ 4,132 00			$ 4,612 00		
1,705 00	1,705 00		Expenses (including $500, repairs to building)	2,390 00		
$ 5,837 00	$ 5,837 00		Total of Vote No. 143		7,002 00	
		144.	QUESNEL AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00		
1,920 00	1,920 00		Assessor	1,920 00		
1,600 00	1,600 00		Clerk	1,600 00		
1,600 00	1,600 00		Clerk	1,600 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,380 00	1,380 00		Clerk	1,380 00		
1,500 00	1,500 00		Clerk	1,320 00		
696 00	696 00		Stenographer	900 00		
900 00	900 00		Stenographer	900 00		
900 00	900 00		Clerk	.....		
.....	.....		Junior Clerk	900 00		
300 00	300 00		Janitor	300 00		
360 00	360 00		Temporary assistance	360 00		
$ 19,256 00	$ 19,256 00		*Carried forward*	$ 19,280 00	$297,925 79	$ 361,170 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS—*Continued.*		
		144.	QUESNEL AGENCY—*Continued.*		
$ 19,256 00	$ 19,256 00		*Brought forward*	$ 19,280 00 $297,925 79	$ 361,170 00
7,269 00	7,269 00		Expenses (including $200, repairs to buildings)	7,340 00	
$ 26,525 00	$ 26,525 00		Total of Vote No. 144	26,620 00	
		145.	QUEEN CHARLOTTE ISLANDS SUB-AGENCY.		
			Salaries:		
$ 900 00	$ 900 00		Mining Recorder	$ 900 00	
547 00	547 00		Expenses	541 25	
$ 1,447 00	$ 1,447 00		Total of Vote No. 145	1,441 25	
		146.	REVELSTOKE AGENCY.		
			Salaries:		
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
1,920 00	1,920 00		Assessor	1,920 00	
1,540 00	1,540 00		Mining Recorder	1,540 00	
1,392 00	1,392 00		Clerk	1,392 00	
900 00	900 00		Stenographer	900 00	
840 00	840 00		Stenographer	840 00	
1,080 00	1,080 00		Janitor	1,080 00	
$ 9,772 00	$ 9,772 00			$ 9,772 00	
4,113 00	4,113 00		Expenses (including $500, repairs to building)	4,475 00	
$ 13,885 00	$ 13,885 00		Total of Vote No. 146	14,247 00	
		147.	ROSSLAND AGENCY.		
			Salaries:		
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
1,800 00	2,400 00		Assessor (Rossland, Fairview, Princeton)	2,400 00	
1,480 00	1,480 00		Mining Recorder and Clerk	1,480 00	
1,392 00	1,392 00		Clerk	1,392 00	
870 00	870 00		Stenographer	870 00	
1,020 00	1,020 00		Janitor	1,020 00	
300 00	300 00		Temporary assistance	300 00	
$ 8,962 00	$ 9,562 00			$ 9,562 00	
4,437 00	4,437 00		Expenses (including $500, repairs to building)	5,492 00	
$ 13,399 00	$ 13,999 00		Total of Vote No. 147	15,054 00	
			Carried forward	$355,288 04	$ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS—*Continued.*			
			Brought forward		$355,288 04	$ 361,170 00
		148.	SMITHERS AGENCY.			
			Salaries:			
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00		
2,040 00	2,040 00		Assessor	2,040 00		
1,720 00	1,720 00		Mining Recorder	1,720 00		
1,392 00	1,392 00		Clerk	1,392 00		
1,392 00	1,500 00		Clerk	1,500 00		
1,272 00	1,272 00		Clerk	1,272 00		
.....	.....		Clerk	1,320 00		
1,020 00	1,200 00		Clerk and Stenographer	1,200 00		
600 00	600 00		Temporary assistance	.....		
$ 11,536 00	$ 11,824 00			$ 12,544 00		
3,550 00	3,550 00		Expenses	3,796 00		
$ 15,086 00	$ 15,374 00		Total of Vote No. 148		16,340 00	
		149.	TELEGRAPH CREEK AGENCY.			
			Salaries:			
$ 1,720 00	$ 1,720 00		Government Agent	$ 1,720 00		
500 00	500 00		Temporary assistance	500 00		
$ 2,220 00	$ 2,220 00			$ 2,220 00		
1,020 00	1,020 00		Expenses (including $900, repairs to building)	2,008 75		
$ 3,240 00	$ 3,240 00		Total of Vote No. 149		4,228 75	
		150.	TROUT LAKE SUB-AGENCY.			
			Salary:			
$ 1,272 00	$ 1,272 00		Mining Recorder	$ 1,272 00		
383 00	383 00		Expenses (including $175, repairs to building)	467 20		
$ 1,655 00	$ 1,655 00		Total of Vote No. 150		1,739 20	
		151.	VANCOUVER AGENCY.			
			Salaries:			
$ 2,820 00	$ 2,820 00		Government Agent	$ 2,820 00		
2,020 00	2,020 00		Mining Recorder, etc.	2,020 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,332 00	1,440 00		Clerk	1,440 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
960 00	960 00		Stenographer	960 00		
$ 11,488 00	$ 11,596 00		*Carried forward*	$ 11,596 00	$377,595 99	$ 361,170 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.					
			DEPARTMENT OF FINANCE—*Continued.*			
			GOVERNMENT AGENTS AND ASSESSORS—*Continued.*			
		151.	VANCOUVER AGENCY—*Continued.*			
$ 11,488 00	$ 11,596 00		*Brought forward*	$ 11,596 00	$377,595 99	$ 361,170 00
			Salaries—*Continued.*			
780 00	780 00		Stenographer	780 00		
.....	.....		Stenographer	780 00		
720 00	720 00		Junior Clerk	720 00		
300 00	300 00		Temporary assistance	300 00		
			Assessor and Collector's Office.			
2,520 00	2,520 00		Assessor	2,640 00		
2,220 00	2,220 00		Collector	2,340 00		
2,020 00	2,020 00		Chief Clerk	2,020 00		
1,600 00	1,600 00		Clerk	1,600 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,452 00	1,452 00		Clerk	1,452 00		
1,200 00	1,200 00		Cashier	1,200 00		
1,700 00	1,700 00		Special Tax-collector	1,700 00		
3,400 00	3,400 00		Two Special Tax-collectors @ $1,700..	.....		
1,700 00	1,700 00		Special Tax-collector	1,700 00		
.....	.....		Clerk	1,500 00		
960 00	960 00		Stenographer	960 00		
.....	.....		Stenographer	840 00		
1,200 00	1,200 00		Temporary assistance	1,200 00		
$ 43,472 00	$ 43,580 00			$ 43,540 00		
			Court-house Attendants.			
1,860 00	1,860 00		Engineer	1,860 00		
1,500 00	1,500 00		Fireman	1,500 00		
1,380 00	1,380 00		Fireman	1,380 00		
1,140 00	1,140 00		Elevator Attendant	.....		
1,500 00	1,500 00		Carpenter	1,500 00		
1,500 00	1,500 00		Chief Janitor	1,500 00		
1,140 00	1,140 00		Nightwatchman	1,140 00		
1,200 00	1,260 00		Nightforeman and Janitor	1,260 00		
1,140 00	1,140 00		Gardener and Janitor	1,320 00		
15,600 00	15,600 00		Thirteen Janitors @ $1,200	15,600 00		
1,140 00	1,140 00		Usher	1,140 00		
1,140 00	1,140 00		Gardener	1,140 00		
73,712 00	$ 73,880 00		*Carried forward*	$ 72,880 00	$377,595 99	$ 361,170 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS—*Continued.*		
$ 73,712 00	$ 73,880 00	151.	VANCOUVER AGENCY—*Continued.*		
			Brought forward	$ 72,880 00	$377,595 99 $ 361,170
			Expenses:		
5,500 00	5,500 00		Office supplies, etc.	4,000 00	
1,200 00	1,200 00		Travelling expenses, etc.	1,200 00	
9,070 00	9,070 00		Maintenance and repairs of building, etc.	10,105 00	
16,000 00	16,000 00		Fuel, light, water, etc.	21,371 00	
$ 105,482 00	$ 105,650 00		Total of Vote No. 151		109,556 00
		152.	VERNON AGENCY.		
			Salaries:		
$ 2,100 00	$ 2,100 00		Government Agent	$ 2,100 00	
2,072 00	2,072 00		Assessor	2,072 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,600 00	1,600 00		Clerk	1,392 00	
1,080 00	1,080 00		Clerk	.....	
780 00	780 00		Stenographer	780 00	
.....	.....		Junior Clerk	780 00	
1,020 00	1,020 00		Janitor	1,020 00	
$ 11,652 00	$ 11,652 00			$ 11,144 00	
			Expenses (including $850, repairs to building)	4,584 00	
$ 15,822 00	$ 15,822 00		Total of Vote No. 152		15,728 00
		153.	VICTORIA ASSESSOR.		
			Salaries:		
$ 2,820 00	$ 2,820 00		Assessor	$ 2,940 00	
2,220 00	2,220 00		Collector	2,340 00	
1,500 00	1,620 00		Chief Clerk	1,620 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	1,320 00	
1,392 00	1,392 00		Clerk	1,392 00	
1,320 00	1,320 00		Clerk	.....	
1,272 00	1,272 00		Clerk	1,272 00	
870 00	870 00		Stenographer	870 00	
1,700 00	1,700 00		Special Collector	1,700 00	
1,700 00	1,700 00		Special Collector	1,700 00	
1,700 00	1,700 00		Special Collector	1,700 00	
500 00	500 00		Temporary assistance	500 00	
$ 19,946 00	$ 20,066 00			$ 18,854 00	
3,985 00	3,985 00		Expenses	4,890 00	
$ 23,931 00	$ 24,051 00		Total of Vote No. 153		23,744 00
			Carried forward		$526,623 99 $ 361,170

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF FINANCE—*Continued.*		
			GOVERNMENT AGENTS AND ASSESSORS—*Continued.*		
			Brought forward	$526,623 99	$ 361,170 00
		154.	WILMER SUB-AGENCY.		
			Salary:		
$ 1,800 00	$ 1,800 00		Mining Recorder, etc. ..... $ 1,800 00		
413 00	413 00		Expenses 605 00		
$ 2,213 00	$ 2,213 00		Total of Vote No. 154	2,405 00	
		155.	YALE SUB-AGENCY.		
			Salary:		
$ 1,660 00	$ 1,660 00		Mining Recorder, etc. ..... $ 1,660 00		
824 00	824 00		Expenses (including $100, repairs to building) 675 00		
$ 2,484 00	$ 2,484 00		Total of Vote No. 155	2,335 00	
		156.	SUNDRY SUB-AGENCIES.		
$ 2,500 00	$ 2,500 00		Commissions, salaries, and expenses .... $ 3,500 00		
$ 2,500 00	$ 2,500 00		Total of Vote No. 156	3,500 00	
		157.	SUNDRY AGENCIES AND ASSESSORS, ETC.		
$ 20,000 00	$ 20,000 00		Construction of fire-proof vaults and purchase of safes for protection of public documents (revote) ..... $ 3,500 00		
$ 20,000 00	$ 20,000 00		Total of Vote No. 157	3,500 00	
$ 533,222 00	$ 537,216 00		Total, Government Agents and Assessors		538,363 99
			MISCELLANEOUS VOTES.		
$ 6,000 00	$ 6,000 00	158.	Printing Public Accounts, Estimates, etc. ..... $ 4,000 00		
		159.	Interest on suitors' funds and Official Guardian		
10,000 00	10,000 00		deposits	8,000 00	
25,000 00	25,000 00	160.	Delinquent extra-municipal school taxes	23,000 00	
840 00	840 00	161.	Premium on fire insurance, Fairview Works	917 00	
35,000 00	35,000 00	162.	Incidentals and contingencies	25,000 00	
76,840 00	$ 76,840 00		Total, Miscellaneous Votes		60,917 00
959,579 00	$ 963,633 00		Total, Department of Finance		$ 960,450 99

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.	Fiscal Year, 1921–22.
		163.	DEPARTMENT OF FISHERIES.	
			Salaries:	
$ 3,720 00	$ 3,720 00		Assistant to the Commissioner	$ 3,720 00
1,600 00	1,600 00		Inspector of Fisheries	1,600 00
1,020 00	1,020 00		Clerk and Stenographer	1,020 00
1,500 00	1,500 00		Salmon Investigator	1,500 00
2,000 00	2,000 00		Overseers and Inspectors	2,000 00
$ 9,840 00	$ 9,840 00			$ 9,840 00
			Expenses:	
3,100 00	3,100 00		Office supplies, etc.	3,100 00
2,500 00	2,500 00		Travelling expenses, etc.	2,500 00
2,000 00	2,000 00		Collection of fishery taxes	2,000 00
650 00	650 00		Seton Lake Hatchery	650 00
$ 18,090 00	$ 18,090 00		Total of Vote No. 163	$ 18,090 0
		164.	DEPARTMENT OF INDUSTRIES.	
			Salaries:	
$ 3,600 00	$ 3,600 00		Deputy Minister	$ 3,600 00
1,800 00	1,800 00		Secretary and Investigator	1,800 00
840 00	840 00		Clerk and Stenographer	840 00
780 00	780 00		Stenographer	780 00
780 00	780 00		Stenographer	780 00
2,100 00	2,100 00		Statistician (information and research)	2,100 00
$ 9,900 00	$ 9,900 00			$ 9,900 00
			Expenses:	
2,400 00	2,400 00		Office supplies, etc.	2,400 00
6,000 00	6,000 00		Travelling expenses, etc.	6,000 00
10,000 00	10,000 00		Appraising and investigation fees, etc.	10,000 00
$ 28,300 00	$ 28,300 00		Total of Vote No. 164	$ 28,300 0
			DEPARTMENT OF LABOUR.	
		165.	General Office.	
			Salaries:	
$ 3,720 00	$ 3,720 00		Deputy Minister	$ 3,720 00
1,900 00	1,900 00		Chief Clerk	1,800 00
1,500 00	1,500 00		Clerk	1,500 00
840 00	840 00		Clerk and Stenographer	840 00
780 00	780 00		Stenographer	780 00
300 00	300 00		Temporary assistance	300 00
$ 9,040 00	$ 9,040 00		*Carried forward*	$ 8,940 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LABOUR—*Continued.*		
		165.	GENERAL OFFICE—*Continued.*		
9,040 00	$ 9,040 00		*Brought forward*	$ 8,940 00	
			Expenses:		
5,000 00	5,000 00		Office supplies, etc.	4,500 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,500 00	
.....	657 80		Expenses and allowance to delegates to Conference on Uniformity of Labour Laws	.....	
15,540 00	$ 16,197 80		Total of Vote No. 165		$ 14,940 00
		166.	MINIMUM WAGE BOARD.		
			Salaries:		
1,800 00	$ 1,800 00		Secretary	$ 1,800 00	
780 00	780 00		Clerk and Stenographer (Vancouver Office)	780 00	
1,000 00	1,000 00		Inspector	1,000 00	
100 00	100 00		Temporary assistance	100 00	
3,680 00	$ 3,680 00			$ 3,680 00	
			Expenses:		
2,800 00	2,800 00		Office supplies, etc.	2,350 00	
2,000 00	2,000 00		Travelling expenses, etc.	2,000 00	
900 00	900 00		Rent, light, etc. (Vancouver Office)	900 00	
9,380 00	$ 9,380 00		Total of Vote No. 166		8,930 00
		167.	EMPLOYMENT SERVICE.		
			Cranbrook Office.		
			Salaries:		
1,320 00	$ 1,320 00		Clerk	$ 1,320 00	
100 00	100 00		Temporary assistance	100 00	
1,420 00	$ 1,420 00			$ 1,420 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
200 00	200 00		Travelling expenses, etc.	200 00	
600 00	600 00		Rent, fuel, light, etc.	600 00	
2,820 00	$ 2,820 00		Total, Cranbrook Office	$ 2,820 00	
			Fernie Office.		
			Salaries:		
1,320 00	$ 1,320 00		Clerk	$ 1,320 00	
100 00	100 00		Temporary assistance	100 00	
1,420 00	$ 1,420 00			$ 1,420 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
200 00	200 00		Travelling expenses, etc.	200 00	
2,220 00	$ 2,220 00		*Carried forward*	$ 2,220 00 $ 2,820 00	$ 23,870 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Ye 1921–2
			DEPARTMENT OF LABOUR—*Continued.*			
		167.	EMPLOYMENT SERVICE—*Continued.*			
			Fernie Office—Continued.			
$ 2,220 00	$ 2,220 00		*Brought forward*	$ 2,220 00	$ 2,820 00	$ 23,8
600 00	600 00		Expenses—*Continued.*			
.....	172 35		Rent, fuel, light, etc.	600 00		
			Special Warrant, No. 13	.....		
$ 2,820 00	$ 2,992 35		Total, Fernie Office		2,820 00	
			Kamloops Office.			
$ 1,320 00	$ 1,320 00		Salaries:			
100 00	100 00		Clerk	$ 1,320 00		
			Temporary assistance	100 00		
$ 1,420 00	$ 1,420 00			$ 1,420 00		
600 00	600 00		Expenses:			
200 00	200 00		Office supplies, etc.	600 00		
600 00	600 00		Travelling expenses, etc.	200 00		
			Rent, fuel, light, etc.	600 00		
$ 2,820 00	$ 2,820 00		Total, Kamloops Office		2,820 00	
			Nanaimo Office.			
$ 1,320 00	$ 1,320 00		Salaries:			
100 00	100 00		Clerk	$ 1,320 00		
			Temporary assistance	100 00		
$ 1,420 00	$ 1,420 00			$ 1,420 00		
600 00	600 00		Expenses:			
200 00	200 00		Office supplies, etc.	600 00		
600 00	600 00		Travelling expenses, etc.	50 00		
			Rent, fuel, light, etc.	600 00		
$ 2,820 00	$ 2,820 00		Total, Nanaimo Office		2,670 00	
			Nelson Office.			
$ 1,500 00	$ 1,500 00		Salaries:			
780 00	780 00		Clerk	$ 1,500 00		
.....	.....		Clerk and Stenographer	.....		
420 00	420 00		Clerk	1,320 00		
			Temporary assistance	.....		
$ 2,700 00	$ 2,700 00			$ 2,820 00		
600 00	600 00		Expenses:			
800 00	800 00		Office supplies, etc.	850 00		
600 00	600 00		Travelling expenses, etc.	500 00		
			Rent, fuel, light, etc.	400 00		
$ 4,700 00	$ 4,700 00		Total, Nelson Office		4,570 00	
			Carried forward		$ 15,700 00	$ 23,8

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LABOUR—*Continued.*		
		167.	EMPLOYMENT SERVICE—*Continued.*		
			Brought forward	$ 15,700 00	$ 23,870 00
			New Westminster Office.		
			Salaries:		
1,320 00	$ 1,320 00		Clerk	$ 1,320 00	
100 00	100 00		Temporary assistance	100 00	
1,420 00	$ 1,420 00			$ 1,420 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
200 00	200 00		Travelling expenses, etc.	50 00	
600 00	600 00		Rent, fuel, light, etc.	500 00	
2,820 00	$ 2,820 00		Total, New Westminster Office		2,570 00
			Prince Rupert Office.		
			Salaries:		
1,500 00	$ 1,500 00		Clerk	$ 1,500 00	
200 00	200 00		Temporary assistance	200 00	
1,700 00	$ 1,700 00			$ 1,700 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
200 00	200 00		Travelling expenses, etc.	200 00	
600 00	600 00		Rent, fuel, light, etc.	600 00	
3,100 00	$ 3,100 00		Total, Prince Rupert Office		3,100 00
			Vancouver Office.		
			Salaries:		
2,700 00	$ 2,700 00		Provincial Superintendent	$ 2,700 00	
1,900 00	1,900 00		Superintendent (Vancouver)	2,160 00	
.....	.....		Assistant Superintendent (Vancouver)	1,680 00	
1,500 00	1,500 00		Clerk	1,500 00	
780 00	780 00		Stenographer	780 00	
1,200 00	1,200 00		Chief Clerk (Women's Department)...	1,200 00	
780 00	780 00		Clerk	780 00	
1,500 00	1,500 00		Clerk	.....	
8,640 00	8,640 00		Six Clerks @ $1,440 each	8,640 00	
2,640 00	2,640 00		Two Clerks @ $1,320 each	2,640 00	
1,320 00	1,320 00		Clerk	1,320 00	
900 00	900 00		Clerk and Stenographer	900 00	
.....	.....		Clerk	780 00	
1,000 00	1,000 00		Temporary assistance	1,000 00	
24,860 00	$ 24,860 00		*Carried forward*	$ 26,080 00	$ 21,370 00 $ 23,870 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF LABOUR—*Continued.*		
		167.	EMPLOYMENT SERVICE—*Continued.*		
			Vancouver Office—Continued.		
$ 24,860 00	$ 24,860 00		*Brought forward*	$ 26,080 00 $ 21,370 00	$ 23,870
			Expenses:		
			Office supplies, etc.	4,500 00	
3,200 00	3,200 00		Travelling expenses, etc.	1,500 00	
2,000 00	2,000 00		Rent, fuel, light, etc.	5,100 00	
4,000 00	4,000 00				
			Total, Vancouver Office	37,180 00	
$ 34,060 00	$ 34,060 00				
			Vernon Office.		
			Salaries:		
$ 1,320 00	$ 1,320 00		Clerk	$ 1,320 00	
100 00	100 00		Temporary assistance	100 00	
$ 1,420 00	$ 1,420 00			$ 1,420 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	600 00	
200 00	200 00		Travelling expenses, etc.	200 00	
600 00	600 00		Rent, fuel, light, etc.	600 00	
$ 2,820 00	$ 2,820 00		Total, Vernon Office	2,820 00	
			Victoria Office.		
			Salaries:		
$ 1,620 00	$ 1,620 00		Superintendent	$ 1,620 00	
1,200 00	1,200 00		Chief Clerk (Women's Department)	1,200 00	
1,500 00	1,500 00		Clerk	.....	
1,440 00	1,440 00		Clerk	1,440 00	
840 00	840 00		Clerk and Stenographer	840 00	
500 00	500 00		Temporary assistance	500 00	
$ 7,100 00	$ 7,100 00			$ 5,600 00	
			Expenses:		
2,000 00	2,000 00		Office supplies, etc.	1,800 00	
500 00	500 00		Travelling expenses, etc.	500 00	
1,200 00	1,200 00		Rent, fuel, light, etc.	1,200 00	
$ 10,800 00	$ 10,800 00		Total, Victoria Office	9,100 00	
			Carried forward	$ 70,470 00	$ 23,870

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LABOUR—*Continued.*		
		167.	EMPLOYMENT SERVICE—*Continued.*		
			Brought forward	$ 70,470 00	$ 23,870 00
			Sub-agencies.		
$ 3,100 00	$ 3,100 00		For the purpose of establishing sub-agencies at other points in the Province (salaries and expenses)	$ 2,400 00	
$ 3,100 00	$ 3,100 00		Total, Sub-agencies	2,400 00	
$ 72,680 00	$ 72,852 35		Total, Employment Service, Vote No. 167		72,870 00
$ 97,600 00	$ 98,430 15		Total, Department of Labour		$ 96,740 00
			DEPARTMENT OF LANDS.		
		168.	MINISTER'S OFFICE.		
			Salaries:		
$ 6,000 00	$ 6,000 00		Minister	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
1,152 00	1,152 00		Clerk and Stenographer	1,152 00	
$ 9,192 00	$ 9,192 00			$ 9,192 00	
			Expenses:		
750 00	750 00		Office supplies, etc.	750 00	
3,000 00	3,000 00		Travelling expenses	2,500 00	
$ 12,942 00	$ 12,942 00		Total of Vote No. 168		$ 12,442 00
		169.	GENERAL OFFICE.		
			Salaries:		
$ 4,320 00	$ 4,320 00		Deputy Minister	$ 4,320 00	
3,000 00	3,000 00		Assistant to Deputy Minister	3,000 00	
2,340 00	2,340 00		Statistician	2,340 00	
1,900 00	1,900 00		Chief Clerk	1,900 00	
1,620 00	1,620 00		Property Clerk	1,620 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,500 00	1,500 00		Clerk	1,500 00	
5,808 00	5,808 00		Four Clerks @ $1,452	5,808 00	
1,380 00	1,380 00		Clerk	1,380 00	
1,320 00	1,320 00		Clerk	1,320 00	
1,272 00	1,313 95		Clerk	1,320 00	
1,272 00	1,272 00		Clerk	1,272 00	
1,152 00	1,152 00		Clerk	1,200 00	
870 00	870 00		Clerk	870 00	
$ 29,474 00	$ 29,515 95		*Carried forward*	$ 29,570 00	$ 12,442 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF LANDS—*Continued.*		
		169.	GENERAL OFFICE—*Continued.*		
$ 29,474 00	$ 29,515 95		*Brought forward*	$ 29,570 00	$ 12,442 00
			Salaries—*Continued.*		
960 00	960 00		Clerk-Stenographer	960 00	
870 00	870 00		Stenographer	870 00	
780 00	780 00		Stenographer	840 00	
570 00	570 00		Junior Clerk	540 00	
570 00	570 00		Junior Clerk	540 00	
.....	.....		Junior Clerk	900 00	
$ 33,224 00	$ 33,265 95		Total of Vote No. 169		34,220 00
		170.	LANDS BRANCH—GENERAL ADMINISTRATION.		
			Salaries:		
$ 3,360 00	$ 3,360 00		Superintendent of Lands	$ 3,360 00	
2,220 00	2,220 00		Assistant Superintendent and Chief Clerk	2,220 00	
2,020 00	2,020 00		Inspector of Lands	2,020 00	
1,900 00	1,900 00		Assistant Chief Clerk	1,900 00	
1,900 00	1,900 00		Accountant	1,900 00	
1,900 00	1,900 00		Crown Grant Clerk	1,900 00	
1,900 00	1,900 00		Status Clerk	1,900 00	
1,800 00	1,800 00		Clerk	1,800 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,632 00	1,632 00		Clerk	1,632 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,440 00	1,440 00		Clerk	1,440 00	
1,152 00	1,152 00		Clerk	1,500 00	
1,272 00	1,272 00		Clerk	1,272 00	
1,320 00	1,320 00		Clerk	1,200 00	
870 00	870 00		Clerk	.....	
870 00	870 00		Clerk	870 00	
540 00	540 00		Junior Clerk	600 00	
1,080 00	1,080 00		Stenographer	1,080 00	
930 00	930 00		Stenographer	930 00	
870 00	900 00		Stenographer	900 00	
780 00	780 00		Stenographer	780 00	
.....	.....		Clerk	1,080 00	
			Immigration Branch and B.C. Soldiers' Settlement.		
3,000 00	3,000 00		Superintendent	3,000 00	
2,340 00	2,340 00		Clerk	.....	
$ 43,208 00	$ 43,238 00		*Carried forward*	$ 41,396 00	$ 46,662 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*		
		170.	LANDS BRANCH—GENERAL ADMINISTRATION—*Continued.*		
43,208 00	$ 43,238 00		*Brought forward*	$ 41,396 00	$ 46,662 00
			Salaries—*Continued.*		
			Immigration Branch and B.C. Soldiers' Settlement—Continued.		
1,080 00	1,080 00		Clerk-Stenographer	1,080 00	
840 00	840 00		Stenographer	840 00	
45,128 00	$ 45,158 00		Total of Vote No. 170		43,316 00
		171.	SURVEY BRANCH.		
			General.		
			Salaries:		
3,600 00	$ 3,600 00		Surveyor-General	$ 3,600 00	
1,600 00	1,600 00		Accountant	1,600 00	
1,560 00	1,560 00		Clerk	1,560 00	
1,500 00	1,500 00		Photostat Operator	1,500 00	
.....	.....		Assistant Photostat Operator	1,080 00	
1,020 00	1,020 00		Blue-print Operator	1,020 00	
600 00	600 00		Junior Clerk	.....	
.....	.....		Clerk	1,200 00	
900 00	900 00		Stenographer	900 00	
720 00	720 00		Stenographer	780 00	
420 00	420 00		Messenger	480 00	
			Survey Division.		
2,640 00	2,640 00		Chief Draughtsman	2,640 00	
2,400 00	2,400 00		Draughtsman	2,400 00	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,740 00	1,740 00		Draughtsman	1,740 00	
1,740 00	1,740 00		Draughtsman	1,740 00	
1,740 00	1,740 00		Draughtsman	1,740 00	
1,740 00	1,740 00		Draughtsman	1,740 00	
1,720 00	1,720 00		Draughtsman	1,720 00	
1,680 00	1,680 00		Draughtsman	1,680 00	
1,540 00	1,540 00		Draughtsman	1,540 00	
1,500 00	1,500 00		Draughtsman	1,500 00	
1,380 00	1,380 00		Draughtsman	1,380 00	
1,272 00	1,272 00		Draughtsman	1,272 00	
480 00	480 00		Apprentice Draughtsman	420 00	
1,440 00	1,440 00		Draughtsman	.....	
			Geographic Division.		
2,760 00	2,760 00		Chief Geographer	2,760 00	
2,220 00	2,220 00		Librarian	2,220 00	
47,112 00	$ 47,112 00		*Carried forward*	$ 47,412 00	$ 89,978 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*		
		171.	SURVEY BRANCH—*Continued.*		
$ 47,112 00	$ 47,112 00		*Brought forward*	$ 47,412 00	$ 89,978
			Salaries—*Continued.*		
			Geographic Division—Continued.		
2,020 00	2,020 00		Draughtsman	2,020 00	
1,920 00	2,010 28		Draughtsman	2,020 00	
1,820 00	1,820 00		Draughtsman	.....	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,800 00	1,800 00		Draughtsman	.....	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,780 00	1,780 00		Draughtsman	1,620 00	
1,680 00	1,680 00		Draughtsman	1,680 00	
1,620 00	1,620 00		Draughtsman	1,620 00	
1,620 00	1,620 00		Draughtsman	1,620 00	
1,500 00	1,500 00		Draughtsman	1,500 00	
3,000 00	3,000 00		Two Draughtsmen	3,000 00	
1,440 00	1,440 00		Draughtsman	1,440 00	
1,300 00	1,300 00		Draughtsman	1,300 00	
1,212 00	1,212 00		Draughtsman	1,212 00	
1,680 00	1,680 00		Map-mounter	1,800 00	
450 00	480 00		Apprentice Draughtsman	420 00	
420 00	420 00		Apprentice Draughtsman	480 00	
$ 75,974 00	$ 76,094 28		Total of Vote No. 171		72,744
		172.	WATER RIGHTS BRANCH.		
			Salaries:		
$ 5,000 00	$ 5,000 00		Comptroller of Water Rights and Consulting Engineer	$ 5,000 00	
2,760 00	2,760 00		Assistant to Comptroller	2,760 00	
3,000 00	3,000 00		Chairman, Board of Investigation	3,000 00	
3,000 00	3,000 00		Member, Board of Investigation	3,000 00	
3,000 00	3,000 00		Member, Board of Investigation	.....	
2,520 00	2,520 00		Law Clerk	2,520 00	
3,300 00	3,300 00		Superintendent of Construction	3,600 00	
3,000 00	3,000 00		Chief Engineer	3,000 00	
2,280 00	2,280 00		Office Engineer	2,280 00	
.....	.....		Engineer	2,400 00	
3,600 00	3,600 00		Two Engineers @ $1,920	3,840 00	
1,800 00	1,800 00		Engineer	.....	
1,800 00	1,800 00		Engineer	1,800 00	
2,080 00	2,080 00		Engineer	2,080 00	
1,800 00	1,800 00		Engineer	1,800 00	
1,740 00	1,740 00		Assistant Engineer	.....	
1,900 00	1,900 00		Senior Draughtsman	1,900 00	
1,780 00	1,780 00		Draughtsman	1,780 00	
$ 44,360 00	$ 44,360 00		*Carried forward*	$ 40,760 00	$ 162,722

FISCAL YEAR, 1920-21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920-21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1920-21.
			DEPARTMENT OF LANDS—*Continued.*		
		172.	WATER RIGHTS BRANCH—*Continued.*		
$ 44,360 00	$ 44,360 00		*Brought forward*	$ 40,760 00	$ 162,722 00
			Salaries—*Continued.*		
1,720 00	1,720 00		Draughtsman	1,720 00	
1,720 00	1,720 00		Draughtsman	.....	
1,660 00	1,660 00		Draughtsman	1,660 00	
1,660 00	1,660 00		Draughtsman	1,660 00	
1,500 00	1,500 00		Draughtsman	1,500 00	
1,600 00	1,600 00		Draughtsman	1,600 00	
1,300 00	1,300 00		Draughtsman	1,300 00	
1,620 00	1,620 00		Draughtsman	.....	
1,500 00	1,500 00		Draughtsman	1,500 00	
1,900 00	1,900 00		Chief Clerk	1,900 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,660 00	1,660 00		Clerk	1,660 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,500 00	1,500 00		Clerk	1,500 00	
1,500 00	1,500 00		Clerk	.....	
1,500 00	1,500 00		Clerk	1,080 00	
1,452 00	1,452 00		Clerk	1,452 00	
930 00	930 00		Stenographer	780 00	
870 00	900 00		Stenographer	900 00	
840 00	840 00		Stenographer	840 00	
780 00	780 00		Stenographer	780 00	
600 00	600 00		Junior Clerk	660 00	
.....	.....		Messenger	360 00	
2,760 00	2,760 00		District Engineer, Kelowna	2,760 00	
2,760 00	2,760 00		District Engineer, Kamloops	2,760 00	
2,760 00	2,760 00		District Engineer, Nelson	2,760 00	
2,520 00	2,520 00		District Engineer, Cranbrook	2,520 00	
2,520 00	2,520 00		District Engineer, Penticton	.....	
1,900 00	1,900 00		Assistant Engineer, Kelowna	1,900 00	
1,900 00	1,900 00		Assistant Engineer, Nelson	1,800 00	
.....	.....		Assistant Engineer, Kamloops	1,720 00	
1,560 00	1,560 00		Draughtsman, Kelowna	.....	
1,500 00	1,500 00		Clerk, Kelowna	.....	
840 00	840 00		Stenographer, Kelowna	840 00	
840 00	840 00		Stenographer, Nelson	840 00	
$ 100,612 00	$ 100,642 00			$ 88,092 00	
4,800 00	4,800 00		*Less* chargeable to Conservation Fund	.....	
$ 95,812 00	$ 95,842 00		Total of Vote No. 172		88,092 00
			Carried forward		$ 250,814 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.	Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.			
			DEPARTMENT OF LANDS—*Continued.*	
			Brought forward	$ 250,814 00
		173.	FOREST BRANCH.	
			Salaries:	
$ 4,020 00	$ 4,020 00		Chief Forester	$ 4,020 00
3,600 00	3,600 00		Assistant Chief Forester	3,600 00
3,300 00	3,300 00		Forester	3,000 00
3,330 00	3,330 00		Forester	.....
3,120 00	3,120 00		Lumber Trade Commissioner	3,120 00
2,700 00	2,700 00		Assistant Forester	2,700 00
2,640 00	2,640 00		Assistant Forester	2,640 00
2,220 00	2,220 00		Assistant Forester	2,220 00
2,520 00	2,520 00		Royalty Inspector	2,520 00
2,520 00	2,520 00		Railway Inspector	2,520 00
2,220 00	2,220 00		Accountant	2,220 00
2,100 00	2,100 00		Assistant Supervisor of Scalers	2,100 00
2,340 00	2,340 00		Assistant Lumber Trade Commissioner	2,340 00
1,920 00	1,920 00		Forest Assistant	.....
1,900 00	1,900 00		Forest Assistant	.....
3,600 00	3,600 00		Two Forest Assistants @ $1,900	3,800 00
.....	.....		Assistant to Forester	2,160 00
2,400 00	2,400 00		Assistant to Forester	2,400 00
.....	.....		Chief Clerk	2,340 00
2,000 00	2,000 00		Assistant Royalty Inspector	2,000 00
1,900 00	1,900 00		Chief Draughtsman	1,900 00
1,800 00	1,800 00		Draughtsman	1,800 00
1,720 00	1,720 00		Draughtsman	1,620 00
1,660 00	1,660 00		Draughtsman	1,660 00
1,680 00	1,680 00		Draughtsman	1,620 00
1,500 00	1,500 00		Draughtsman	1,500 00
.....	.....		Draughtsman	1,440 00
1,152 00	1,152 00		Junior Draughtsman	1,152 00
3,800 00	3,800 00		Two Clerks @ $1,900	3,800 00
5,160 00	5,160 00		Three Clerks @ $1,720	5,160 00
1,600 00	1,600 00		Clerk	1,600 00
1,600 00	1,600 00		Clerk	1,600 00
1,660 00	1,660 00		Clerk	1,660 00
1,660 00	1,660 00		Clerk	1,660 00
1,540 00	1,540 00		Clerk	1,540 00
1,660 00	1,660 00		Clerk	1,660 00
1,500 00	1,500 00		Clerk	1,500 00
1,500 00	1,500 00		Clerk	1,500 00
1,452 00	1,452 00		Clerk	1,452 00
1,452 00	1,452 00		Clerk	1,452 00
1,392 00	1,392 00		Clerk	1,080 00
1,272 00	1,272 00		Clerk	900 00
$ 87,110 00	$ 87,110 00		*Carried forward*	$ 84,956 00

FISCAL YEAR, 1920–21.

Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*		
		173.	FOREST BRANCH—*Continued.*		
$ 87,110 00	$ 87,110 00		*Brought forward*	$ 84,956 00	$ 250,814 00
			Salaries—*Continued.*		
.....	.....		Clerk	1,500 00	
.....	.....		Clerk	1,500 00	
1,152 00	1,152 00		Clerk	1,152 00	
1,080 00	1,080 00		Stenographer	1,080 00	
1,020 00	1,020 00		Stenographer	1,020 00	
960 00	960 00		Stenographer	960 00	
930 00	930 00		Stenographer	840 00	
870 00	870 00		Stenographer	780 00	
840 00	840 00		Stenographer	840 00	
1,680 00	1,680 00		Two Stenographers	1,680 00	
960 00	960 00		Stenographer	960 00	
420 00	420 00		Messenger	420 00	
420 00	420 00		Messenger	420 00	
$ 97,442 00	$ 97,442 00				$ 98,108 00
			Southern Coast, Vancouver.		
3,600 00	3,600 00		Forester	3,600 00	
2,640 00	2,640 00		Assistant Forester	2,400 00	
2,400 00	2,400 00		Assistant Forester	2,400 00	
1,800 00	1,800 00		Forest Assistant	1,900 00	
2,080 00	2,080 00		Chief Clerk	2,080 00	
1,620 00	1,620 00		Draughtsman	1,500 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,020 00	1,020 00		Clerk	780 00	
960 00	960 00		Clerk	960 00	
900 00	900 00		Stenographer	840 00	
870 00	870 00		Stenographer	870 00	
780 00	780 00		Stenographer	780 00	
780 00	780 00		Clerk	840 00	
840 00	840 00		Clerk	840 00	
840 00	840 00		Stenographer	900 00	
780 00	780 00		Junior Clerk	720 00	
.....	.....		Clerk	1,500 00	
2,280 00	2,280 00		Supervisor	2,280 00	
2,160 00	2,160 00		Supervisor	2,160 00	
2,160 00	2,160 00		Supervisor	2,160 00	
2,160 00	2,160 00		Supervisor	2,100 00	
1,500 00	1,500 00		Supervisor's Assistant	1,800 00	
$ 35,222 00	$ 35,222 00		*Carried forward*	$ 36,462 00	$ 98,108 00 $ 250,814 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.					
			DEPARTMENT OF LANDS—*Continued.*			
		173.	FOREST BRANCH—*Continued.*			
$ 35,222 00	$ 35,222 00		*Brought forward*	$ 36,462 00	$ 98,108 00	$ 250,814 00
			Salaries—*Continued.*			
			Southern Coast, Vancouver—Continued.			
3,000 00	3,000 00		Two Supervisor's Assistants	3,000 00		
7,600 00	7,600 00		Four Rangers @ $1,900	7,600 00		
8,760 00	8,760 00		Five Rangers @ $1,800	9,000 00		
1,800 00	1,800 00		Ranger	.....		
10,860 00	10,860 00		Eight Rangers @ $1,680	13,440 00		
.....	.....		Four Rangers @ $1,500	6,000 00		
1,680 00	1,680 00		Ranger	.....		
.....	.....		Four Wireless Telegraph Operators @ $1,500	6,000 00		
1,380 00	1,380 00		Telephone Lineman	1,380 00		
1,260 00	1,260 00		Export Patrolman	1,260 00		
1,320 00	1,320 00		Storekeeper	.....		
.....	.....		Supervisor of Scalers	3,120 00		
.....	.....		Assistant Supervisor of Scalers	2,520 00		
.....	.....		Eight Scalers @ $2,100	16,800 00		
.....	.....		Scaler	1,920 00		
.....	.....		Two Scalers @ $1,800	3,600 00		
.....	.....		Recorder of Scaling	1,900 00		
1,020 00	1,020 00		Assistant Recorder of Scaling	1,020 00		
900 00	900 00		Clerk	900 00		
900 00	900 00		Clerk	900 00		
900 00	900 00		Clerk	840 00		
			Southern Interior, Headquarters.			
3,000 00	3,000 00		Forester	.....		
2,400 00	2,400 00		Assistant Forester	.....		
.....	.....		Clerk	.....		
.....	.....		Stenographer	.....		
			(a.) Vernon.			
2,460 00	2,460 00		District Forester	2,460 00		
2,020 00	2,020 00		Assistant District Forester	2,020 00		
1,500 00	1,500 00		Clerk	1,500 00		
1,900 00	1,900 00		Ranger	1,900 00		
1,900 00	1,900 00		Ranger	.....		
1,500 00	1,500 00		Ranger	1,680 00		
1,500 00	1,500 00		Two Rangers @ $1,500	3,000 00		
.....	.....		Stenographer	900 00		
$ 94,782 00	$ 94,782 00		*Carried forward*	$131,122 00	$ 98,108 00	$ 250,814 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*			
		173.	FOREST BRANCH—*Continued.*			
94,782 00	$ 94,782 00		*Brought forward*	$131,122 00	$ 98,108 00	$ 250,814 00
			Salaries—*Continued.*			
			Southern Interior, Headquarters—Continued.			
			(b.) Nelson.			
2,520 00	2,520 00		District Forester	2,520 00		
1,920 00	1,920 00		Assistant District Forester	2,020 00		
.....	.....		Forest Assistant	1,800 00		
1,152 00	1,152 00		Clerk	1,152 00		
5,700 00	5,700 00		Three Rangers @ $1,900	5,700 00		
1,800 00	1,800 00		Ranger	1,680 00		
1,600 00	1,680 00		Ranger	1,680 00		
.....	.....		Ranger	1,500 00		
.....	.....		Stenographer	900 00		
			(c.) Cranbrook.			
2,400 00	2,400 00		District Forester	2,400 00		
1,920 00	1,920 00		Assistant District Forester	2,100 00		
.....	.....		Draughtsman	1,500 00		
1,500 00	1,500 00		Clerk	1,152 00		
3,800 00	3,800 00		Two Rangers @ $1,900	3,800 00		
1,800 00	1,800 00		Ranger	1,680 00		
3,000 00	3,000 00		Two Rangers @ $1,680	3,360 00		
.....	.....		Ranger	1,500 00		
			Northern Interior, Headquarters.			
2,800 00	2,800 00		Forester	3,000 00		
.....	.....		Draughtsman	1,000 00		
.....	.....		Clerk	1,500 00		
.....	.....		Clerk-Stenographer	1,080 00		
			(a.) Western.			
2,700 00	2,700 00		District Forester	.....		
1,152 00	1,152 00		Clerk	.....		
1,920 00	1,920 00		Supervisor	1,920 00		
1,800 00	1,800 00		Ranger	1,800 00		
1,500 00	1,500 00		Ranger	1,500 00		
1,500 00	1,500 00		Ranger	1,500 00		
			(b.) Eastern.			
1,920 00	1,920 00		Supervisor	1,920 00		
1,680 00	1,680 00		Ranger	1,800 00		
1,680 00	1,680 00		Ranger	1,680 00		
.....	.....		Ranger	1,500 00		
142,546 00	$ 142,626 00		*Carried forward*	$188,366 00	$ 98,108 00	$ 250,814 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF LANDS—*Continued.*		
		173.	FOREST BRANCH—*Continued.*		
			Brought forward	$188,366 00	$ 98,108 00 $ 250,814
$ 142,546 00	$ 142,626 00		Salaries—*Continued.*		
			Northern Interior, Headquarters—Continued.		
			(c.) Cariboo.		
2,400 00	2,400 00		District Forester	2,400 00	
1,920 00	1,920 00		Assistant District Forester	1,920 00	
1,380 00	1,380 00		Clerk	1,152 00	
4,860 00	4,860 00		Three Rangers @ $1,500	4,500 00	
1,680 00	1,680 00		Ranger	.....	
			(d.) Kamloops.		
2,400 00	2,400 00		District Forester	2,400 00	
1,920 00	1,920 00		Assistant District Forester	2,020 00	
1,152 00	1,192 00		Clerk	1,500 00	
1,800 00	1,800 00		Ranger	1,800 00	
1,680 00	1,680 00		Ranger	1,800 00	
1,680 00	1,680 00		Ranger	1,680 00	
1,500 00	1,500 00		Ranger	1,500 00	
			Prince Rupert, Headquarters.		
2,700 00	2,700 00		Forester	3,000 00	
.....	.....		Forest Assistant	1,900 00	
1,600 00	1,600 00		Clerk	1,600 00	
1,080 00	1,080 00		Clerk-Stenographer	1,200 00	
1,080 00	1,080 00		Stenographer	1,080 00	
			(a.) Coast.		
2,160 00	2,160 00		Supervisor	2,160 00	
1,660 00	1,660 00		Supervisor's Assistant	1,500 00	
1,680 00	1,680 00		Ranger	1,800 00	
1,500 00	1,500 00		Ranger	.....	
1,500 00	1,500 00		Ranger	.....	
1,500 00	1,500 00		Ranger	1,680 00	
1,500 00	1,500 00		Ranger	1,500 00	
.....	.....		Ranger	1,680 00	
1,440 00	1,440 00		Launch Captain	.....	
.....	.....		Scaler	1,800 00	
960 00	960 00		Stenographer	900 00	
			(b.) Hazelton.		
2,100 00	2,100 00		Supervisor	2,100 00	
.....	.....		Supervisor's Assistant	1,500 00	
$ 189,378 00	$ 189,498 00		*Carried forward*	$236,438 00	$ 98,108 00 $ 250,814

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*			
		173.	FOREST BRANCH—*Continued.*			
189,378 00	$ 189,498 00		*Brought forward*	$236,438 00	$ 98,108 00	$ 250,814 00
			Salaries—*Continued.*			
			Prince Rupert, Headquarters—Continued.			
			(c.) Hazelton—Continued.			
1,500 00	1,500 00		Ranger	1,500 00		
.....	.....		Ranger	1,680 00		
190,878 00	$ 190,998 00				239,618 00	
			Grazing.			
3,720 00	3,720 00		Grazing Commissioner	$ 3,720 00		
1,920 00	1,920 00		Assistant Grazing Commissioner	1,920 00		
900 00	900 00		Stenographer	900 00		
6,540 00	$ 6,540 00				6,540 00	
			Toronto Office.			
3,000 00	3,000 00		Lumber Trade Commissioner	$ 3,000 00		
1,200 00	1,200 00		Clerk	1,200 00		
4,200 00	$ 4,200 00				4,200 00	
299,060 00	$ 299,180 00				$348,466 00	
			Less chargeable to Forest Protection Fund	$ 80,940 00		
67,030 00	$ 67,030 00		*Less* chargeable to Scaling Fund..	36,220 00		
.....	.....		*Less* chargeable to Lumber Trade Extension	10,620 00		
10,620 00	10,620 00					
77,650 00	$ 77,650 00				127,780 00	
221,410 00	$ 221,530 00		Total of Vote No. 173			220,686 00
			GENERAL.			
25,000 00	$ 25,000 00	174.	Temporary assistance		$ 25,000 00	
25,000 00	$ 25,000 00		Total of Vote No. 174			25,000 00
		175.	Expenses (including General Office and Branches):			
48,650 00	$ 48,650 00		Office supplies, etc.		$ 55,000 00	
			Travelling expenses:			
2,700 00	2,700 00		Lands Branch	$ 3,500 00		
500 00	500 00		Survey Branch	500 00		
51,850 00	$ 51,850 00		*Carried forward*	$ 4,000 00	$ 55,000 00	$ 496,500 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF LANDS—*Continued.*		
			GENERAL—*Continued.*		
$ 51,850 00	$ 51,850 00		*Brought forward*	$ 4,000 00 $ 55,000 00	$ 496,500
		175.	Expenses (including General Office and Branches)—*Continued.*		
			Travelling expenses—*Continued.*		
14,000 00	14,000 00		Water Rights Branch	10,000 00	
44,875 00	44,875 00		Forest Branch	46,500 00	
				60,500 00	
49,950 00	49,950 00		Construction, purchase, maintenance of launches and autos, including subsistence of crews, etc. ..	70,000 00	
4,030 00	4,030 00		Rent and upkeep of District Offices	4,500 00	
.....	.....		Wireless telephone, rental of instruments, etc. ...	3,750 00	
15,000 00	15,000 00		Incidentals	18,450 00	
$ 179,705 00	$ 179,705 00		Total of Vote No. 175		212,200
			MISCELLANEOUS VOTES.		
$ 150,000 00	$ 150,000 00	176.	Forest Protection Fund	$300,000 00	
40,000 00	40,000 00	177.	Lumber trade extension	30,000 00	
40,000 00	40,000 00	178.	Reconnaissance, growth studies and cruising	75,000 00	
10,000 00	10,000 00	179.	Insect damage: investigation and control	10,000 00	
3,500 00	3,500 00	180.	Grazing: range improvement	6,000 00	
45,000 00	45,000 00	181.	Water surveys	40,000 00	
10,000 00	10,000 00	....	Well-drilling	.....	
7,500 00	7,500 00	182.	British Columbia Hydrometric Survey	7,500 00	
3,000 00	3,000 00	....	Special studies: duty of water	.....	
700 00	700 00	183.	Rainfall and climatic statistics	700 00	
500 00	500 00	184.	Irrigation Convention	500 00	
231,000 00	231,000 00	185.	Land surveys	200,000 00	
29,000 00	29,000 00	186.	Photo-topographical Surveys	30,000 00	
10,000 00	10,000 00	187.	Lithograph maps	12,000 00	
10,000 00	10,000 00	188.	Publicity	10,000 00	
10,000 00	10,000 00	189.	General investigations	10,000 00	
10,000 00	10,000 00	190.	Contingencies	10,000 00	
25,000 00	25,000 00	191.	Oil investigations	60,000 00	
		192.	Municipal taxes under "Townsite Proportionate		
.....	60,000 00		Allotment Act, 1918"	250,000 00	
.....	13,000 00	193.	"Soldiers' Land Act, 1918"	10,000 00	
.....	6,000 00	194.	Refunds under "Land Act"	2,000 00	
.....	6,500 00	195.	Refunds under "Revenue Act Amendment Act, 1920"	2,000 00	
$ 635,200 00	$ 720,700 00		Total, Miscellaneous Votes		1,065,700
$ 1,324,395 00	$ 1,410,237 23		Total, Department of Lands		$1,774,400

FISCAL YEAR, 1920–21. Original Estimates Approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF MINES.		
		196.	MINISTER'S OFFICE.		
			Salaries:		
6,000 00	$ 6,000 00		Minister of Mines	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
8,040 00	$ 8,040 00			$ 8,040 00	
			Expenses:		
1,025 00	1,025 00		Office supplies, etc.	1,025 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,500 00	
10,565 00	$ 10,565 00		Total of Vote No. 196		$ 10,565 00
		197.	GENERAL OFFICE.		
			Salaries:		
4,000 00	$ 4,000 00		Deputy Minister	$ 4,000 00	
2,400 00	2,400 00		Chief Clerk and Gold Commissioner	2,400 00	
1,152 00	1,152 00		Clerk	1,500 00	
960 00	960 00		Clerk and Stenographer	960 00	
900 00	900 00		Clerk	780 00	
9,412 00	$ 9,412 00			$ 9,640 00	
			Expenses:		
2,340 00	2,340 00		Office supplies, etc.	2,300 00	
150 00	150 00		Travelling expenses, etc.	150 00	
7,800 00	7,800 00		Printing, binding, and advertising, etc.	8,000 00	
19,702 00	$ 19,702 00		Total of Vote No. 197		20,090 00
		198.	MINES INSPECTION BRANCH.		
			Salaries:		
4,620 00	$ 4,620 00		Chief Inspector of Mines	$ 4,000 00	
2,760 00	2,760 00		Inspector	2,820 00	
2,700 00	2,700 00		Inspector	2,700 00	
2,640 00	2,640 00		Inspector	2,640 00	
2,280 00	2,280 00		Inspector	2,280 00	
2,280 00	2,280 00		Inspector	2,100 00	
2,100 00	2,100 00		Inspector	2,100 00	
4,800 00	4,800 00		Two Inspectors and Examiners of Mine Officials and Miners @ $2,400	4,800 00	
2,100 00	2,100 00		Inspector	2,100 00	
1,980 00	1,980 00		Inspector	1,980 00	
840 00	840 00		Stenographer	780 00	
29,100 00	$ 29,100 00		*Carried forward*	$ 28,300 00	$ 30,655 00

Fiscal Year, 1920–21.		No. of Vote.	SERVICE.		Fiscal Y 1921–2
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF MINES—*Continued.*		
$ 29,100 00	$ 29,100 00	198.	MINES INSPECTION BRANCH—*Continued.*		
			Brought forward	$ 28,300 00	$ 30,6
			Expenses:		
1,200 00	1,200 00		Office supplies, etc.	2,000 00	
10,300 00	10,300 00		Travelling expenses, etc.	10,000 00	
$ 40,600 00	$ 40,600 00		Total of Vote No. 198		40,3
		199.	BUREAU OF MINES.		
			Salaries:		
$ 4,240 00	$ 4,240 00		Provincial Mineralogist and Assayer	$ 4,240 00	
2,640 00	2,640 00		Assistant Assayer and Public Analyst	2,640 00	
1,780 00	1,780 00		Clerk	1,780 00	
1,300 00	1,300 00		Clerk	1,300 00	
1,560 00	1,560 00		Laboratory Assistant	1,560 00	
1,260 00	1,260 00		Caretaker	1,260 00	
$ 12,780 00	$ 12,780 00			$ 12,780 00	
			Expenses:		
3,350 00	3,350 00		Office supplies, etc.	3,500 00	
500 00	500 00		Travelling expenses, etc.	250 00	
$ 16,630 00	$ 16,630 00		Total of Vote No. 199		16,5
		200.	MINE-RESCUE AND TRAINING STATIONS.		
			Salaries:		
$ 1,440 00	$ 1,440 00		Instructor and Caretaker	$ 1,440 00	
1,380 00	1,380 00		Instructor and Caretaker	1,380 00	
1,380 00	1,380 00		Instructor and Caretaker	1,380 00	
1,680 00	1,680 00		Instructor and Caretaker	720 00	
$ 5,880 00	$ 5,880 00			$ 4,920 00	
			Expenses:		
250 00	250 00		Office supplies, etc.	125 00	
10,000 00	10,000 00		Apparatus and miscellaneous	8,000 00	
1,200 00	1,200 00		Travelling expenses, etc.	600 00	
$ 17,330 00	$ 17,330 00		Total of Vote No. 200		13,6
			MISCELLANEOUS VOTES.		
$ 1,000 00	$ 1,000 00	201.	Grant to Western Branch Canadian Mining Institute	$ 1,000 00	
2,500 00	2,500 00	202.	Grant to Vancouver Chamber of Mines (conditional)	2,500 00	
2,500 00	2,500 00	203.	Grants to Mining Conventions	2,000 00	
100,000 00	100,000 00	204.	"Mines Development Act," Supplementary	50,000 00	
$ 106,000 00	$ 106,000 00		*Carried forward*	$ 55,500 00	$ 101,1

Fiscal Year, 1920–21. Original Estimates Approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF MINES—*Continued.*		
			MISCELLANEOUS VOTES—*Continued.*		
106,000 00	$ 106,000 00		*Brought forward*	$ 55,500 00	$ 101,130 00
75,000 00	75,000 00	205.	"Mineral Survey and Development Act," Supplementary	50,000 00	
.....	.....	206.	Subsidy *re* explosives to assist *bona-fide* mineral prospectors	10,000 00	
.....	50,000 00	....	Special Warrant No.3—Returned soldiers' prospecting	.....	
181,000 00	$ 231,000 00		Total, Miscellaneous Votes		115,500 00
			STATUTORY.		
34,950 36	$ 34,950 36	206A.	"Mines Development Act, 1916"	$ 34,950 36	
54,424 02	54,424 02	206B.	"Mineral Survey and Development Act, 1917"	54,424 02	
89,374 38	$ 89,374 38		Total, Statutory		89,374 38
375,201 38	$ 425,201 38		Total, Department of Mines		$ 306,004 38
			DEPARTMENT OF THE PROVINCIAL SECRETARY.		
		207.	MINISTER'S OFFICE.		
			Salaries:		
6,000 00	$ 6,000 00		Provincial Secretary	$ 6,000 00	
1,140 00	1,140 00		(Acting) Secretary	1,260 00	
7,140 00	$ 7,140 00			$ 7,260 00	
			Expenses:		
800 00	800 00		Office supplies, etc.	800 00	
1,500 00	1,500 00		Travelling expenses, etc.	1,500 00	
9,440 00	$ 9,440 00		Total of Vote No. 207		$ 9,560 00
		208.	GENERAL OFFICE.		
			Salaries:		
3,720 00	$ 3,720 00		Deputy Provincial Secretary	$ 3,720 00	
2,340 00	2,340 00		Chief Clerk	2,340 00	
1,780 00	1,780 00		Postal Clerk	1,780 00	
900 00	900 00		Clerk	900 00	
780 00	780 00		Stenographer	780 00	
660 00	660 00		Junior Clerk	900 00	
.....	.....		Assistant Postal Clerk and Stenographer	780 00	
1,250 00	1,250 00		Temporary assistance	350 00	
11,430 00	$ 11,430 00		*Carried forward*	$ 11,550 00	$ 9,560 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Y 1921–2
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
		208.	GENERAL OFFICE—*Continued.*		
$ 11,430 00	$ 11,430 00		*Brought forward*	$ 11,550 00	$ 9,5
			Expenses:		
2,500 00	2,500 00		Office supplies, etc.	2,500 00	
250 00	250 00		Travelling expenses, etc.	1,500 00	
$ 14,180 00	$ 14,180 00		Total of Vote No. 208		15,5
		209.	PROVINCIAL BOARD OF HEALTH.		
			Salaries:		
$ 4,320 00	$ 4,320 00		Secretary	$ 4,320 00	
3,600 00	3,600 00		Hospital Inspector and Travelling Medical Health Officer	3,600 00	
2,400 00	2,400 00		Chief Sanitary Inspector	2,400 00	
.....	.....		Clerk	1,500 00	
1,020 00	1,020 00		Clerk	1,020 00	
840 00	780 00		Clerk	780 00	
1,720 00	1,680 00		Deputy Registrar, Births, Deaths, and Marriages	1,680 00	
1,500 00	1,200 00		Clerk	1,200 00	
960 00	960 00		Clerk	960 00	
.....	.....		Clerk	720 00	
1,020 00	780 00		Stenographer	780 00	
.....	.....		Temporary assistance	500 00	
$ 17,380 00	$ 16,740 00			$ 19,460 00	
			Expenses:		
3,650 00	3,650 00		Office supplies, etc.	6,650 00	
6,000 00	6,000 00		Travelling expenses, etc.	6,500 00	
10,000 00	10,000 00		Medical inspection of schools	8,000 00	
.....	.....		Public-health nursing	12,000 00	
30,000 00	30,000 00		Incidentals and emergencies	38,000 00	
$ 67,030 00	$ 66,390 00		Total of Vote No. 209		90,6
		210.	PROVINCIAL LIBRARY AND ARCHIVES.		
			Salaries:		
$ 2,400 00	$ 2,400 00		Librarian and Archivist	$ 2,400 00	
1,540 00	1,540 00		Legislative Reference Clerk	1,540 00	
1,720 00	1,720 00		Chief Cataloguer	1,720 00	
1,180 00	1,180 00		Assistant Cataloguer	1,180 00	
870 00	.....		Second Assistant Cataloguer	.....	
1,020 00	1,020 00		Reference Clerk	1,020 00	
1,140 00	870 00		Assistant Reference Clerk	870 00	
870 00	870 00		Archives Indexer	870 00	
870 00	870 00		Stenographer and Book-keeper	870 00	
870 00	70 00		Stenographer	.....	
$ 12,480 00	$ 10,540 00		*Carried forward*	$ 10,470 00	$ 115,7

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
		210.	PROVINCIAL LIBRARY AND ARCHIVES—*Continued.*		
12,480 00	$ 10,540 00		*Brought forward*	$ 10,470 00	$ 115,720 00
			Salaries—*Continued.*		
540 00	540 00		Apprentice Clerk	600 00	
.....	.....		Temporary assistance	500 00	
$ 13,020 00	$ 11,080 00			$ 11,570 00	
			Expenses:		
7,500 00	7,500 00		Office supplies, books, subscriptions, etc.	8,000 00	
$ 20,520 00	$ 18,580 00		Total of Vote No. 210		19,570 00
		211.	"PUBLIC LIBRARIES ACT."		
			Salaries:		
$ 1,740 00	$ 1,740 00		Superintendent	$ 1,740 00	
960 00	960 00		Assistant Superintendent	960 00	
$ 2,700 00	$ 2,700 00			$ 2,700 00	
			Expenses:		
700 00	700 00		Office supplies, etc.	1,420 00	
2,500 00	2,500 00		Books and periodicals	2,500 00	
.....	.....		Books and periodicals for schools and salary of Supervisor	3,000 00	
700 00	700 00		Freight and express	800 00	
.....	.....		Grants in aid of libraries	1,000 00	
1,300 00	1,300 00		Travelling expenses, etc.	1,300 00	
200 00	200 00		Incidentals and contingencies	300 00	
$ 8,100 00	$ 8,100 00		Total of Vote No. 211		13,020 00
		212.	PROVINCIAL MUSEUM.		
			Salaries:		
$ 2,400 00	$ 2,400 00		Director	$ 2,400 00	
840 00	900 00		Recorder	900 00	
1,540 00	1,540 00		Assistant Biologist	1,540 00	
1,320 00	1,320 00		Attendant	1,320 00	
1,200 00	1,200 00		Attendant	1,200 00	
600 00	600 00		Temporary assistance	600 00	
$ 7,900 00	$ 7,960 00			$ 7,960 00	
			Expenses:		
1,125 00	1,125 00		Office supplies, etc.	1,125 00	
1,583 00	1,583 00		Incidentals and contingencies	1,583 00	
$ 10,608 00	$ 10,668 00		Total of Vote No. 212		10,668 00
			Carried forward		$ 158,978 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.			Fiscal Year, 1921–22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*			
			Brought forward			$ 158,978 0
			MENTAL HOSPITALS.			
		213.	NEW WESTMINSTER.			
			Salaries:			
$ 3,720 00	$ 3,720 00		Medical Superintendent of Institutions	$ 3,600 00		
2,700 00	2,700 00		Assistant Medical Superintendent	.....		
1,920 00	1,920 00		Assistant Physician	2,220 00		
.....	.....		Assistant Physician	1,800 00		
1,684 00	1,684 00		Receiving Clerk	1,684 00		
1,420 00	1,420 00		Laboratory Assistant	1,020 00		
1,392 00	1,392 00		Clinical Clerk and Stenographer	1,392 00		
780 00	780 00		Second Stenographer	780 00		
77,180 00	77,180 00		Sundry employees	88,424 00		
$ 90,796 00	$ 90,796 00			$100,920 00		
			Expenses:			
2,400 00	2,400 00		Office supplies, etc.	2,000 00		
500 00	500 00		Travelling expenses, etc.	400 00		
20,000 00	20,000 00		Fuel, light, water, etc.	27,000 00		
10,000 00	10,000 00		Maintenance and repairs of buildings, etc.	18,500 00		
4,000 00	4,000 00		Furniture and fixtures	10,000 00		
50,000 00	50,000 00		Provisions, etc.	55,000 00		
16,000 00	16,000 00		Uniforms and clothing	22,500 00		
2,500 00	2,500 00		Medical and surgical supplies	2,800 00		
4,000 00	4,000 00		Examinations, commitals, and transportation	7,500 00		
12,000 00	12,000 00		Incidentals and contingencies	12,000 00		
$ 212,196 00	$ 212,196 00		Total of Vote No. 213		$258,620 00	
		214.	ESSONDALE.			
			Salaries:			
$ 2,700 00	$ 2,700 00		Assistant Medical Superintendent	$ 2,820 00		
2,100 00	2,100 00		Assistant Physician	1,920 00		
1,800 00	1,800 00		Assistant Physician	1,800 00		
2,520 00	2,520 00		Bursar, Institutions and Farm	2,520 00		
1,420 00	1,420 00		Assistant Bursar	1,420 00		
1,392 00	1,392 00		Book-keeper	1,392 00		
1,332 00	1,332 00		Clinical Clerk and Stenographer	1,332 00		
960 00	960 00		Business Stenographer	960 00		
780 00	780 00		Junior Stenographer	780 00		
95,864 00	95,864 00		Sundry employees	102,692 00		
$ 110,868 00	$ 110,868 00		*Carried forward*	$117,636 00	$258,620 00	$ 158,978 0

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
			MENTAL HOSPITALS—*Continued.*		
		214.	ESSONDALE—*Continued.*		
110,868 00	$ 110,868 00		*Brought forward*	$117,636 00 $258,620 00	$ 158,978 00
			Expenses:		
2,600 00	2,600 00		Office supplies, etc.	3,000 00	
1,000 00	1,000 00		Travelling expenses, etc.	1,200 00	
36,000 00	36,000 00		Fuel, light, water, etc.	40,000 00	
10,500 00	10,500 00		Maintenance and repairs of buildings, etc.	12,000 00	
9,000 00	9,000 00		Furniture and fixtures	15,000 00	
75,000 00	75,000 00		Provisions, etc.	100,000 00	
16,000 00	16,000 00		Uniforms and clothing	20,000 00	
1,800 00	1,800 00		Medical and surgical supplies	2,500 00	
2,000 00	2,000 00		Examinations, committals, and transportation	1,000 00	
16,020 00	16,020 00		Incidentals and contingencies	15,000 00	
280,788 00	$ 280,788 00		Total of Vote No. 214		327,336 00
		215.	COLONY FARM AND NURSERY, ESSONDALE.		
			Salaries:		
2,520 00	$ 2,520 00		Farm Superintendent	$ 2,400 00	
1,152 00	1,152 00		Book-keeper	1,152 00	
25,980 00	25,980 00		Sundry employees	26,580 00	
29,652 00	$ 29,652 00			$ 30,132 00	
			Expenses:		
600 00	600 00		Office supplies, etc.	500 00	
1,000 00	1,000 00		Travelling expenses, etc.	1,000 00	
2,000 00	2,000 00		Fuel, light, water, etc.	5,000 00	
4,500 00	4,500 00		Maintenance and repairs of buildings, etc.	4,500 00	
3,000 00	3,000 00		Provisions, etc.	3,000 00	
30,000 00	30,000 00		Feed for stock	35,000 00	
4,000 00	4,000 00		Fertilizer and seed	4,000 00	
2,400 00	2,400 00		Testing cows	2,400 00	
1,000 00	1,000 00		Implements, harness, etc.	1,000 00	
1,000 00	1,000 00		Blacksmith supplies	1,000 00	
1,000 00	1,000 00		Farm roads and bridges	1,000 00	
8,000 00	8,000 00		Incidentals and contingencies	8,000 00	
88,152 00	$ 88,152 00		Total of Vote No. 215		96,532 00
			Carried forward	$682,488 00	$ 158,978 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	FISCAL YEAR, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
			MENTAL HOSPITALS—*Continued.*		
			Brought forward	$682,488 00	$ 158,978
		216.	MENTAL HOME (SAANICH), COLQUITZ.		
			Salaries:		
$ 1,420 00	$ 1,420 00		Supervisor	$ 1,440 00	
1,200 00	1,200 00		Visiting Physician	1,200 00	
.....	.....		Visiting Dentist	180 00	
14,160 00	14,160 00		Sundry employees	13,888 00	
$ 16,780 00	$ 16,780 00			$ 16,708 00	
			Expenses:		
250 00	250 00		Office supplies, etc.	250 00	
250 00	250 00		Travelling expenses, etc.	300 00	
5,000 00	5,000 00		Fuel, light, water, etc.	5,300 00	
2,500 00	2,500 00		Maintenance and repairs of buildings, etc.	2,500 00	
1,200 00	1,200 00		Furniture and fixtures	1,500 00	
12,000 00	12,000 00		Provisions	14,000 00	
3,000 00	3,000 00		Uniforms and clothing	3,000 00	
500 00	500 00		Medical and surgical supplies	500 00	
5,000 00	5,000 00		Incidentals and contingencies	4,000 00	
$ 46,480 00	$ 46,480 00		Total of Vote No. 216	48,058 00	
$ 627,616 00	$ 627,616 00		Total, Mental Hospitals		730,546
		217.	PROVINCIAL HOME, KAMLOOPS.		
			Salaries:		
$ 1,300 00	$ 1,300 00		Superintendent	$ 1,300 00	
900 00	900 00		Matron	900 00	
10,000 00	10,000 00		Sundry employees	10,000 00	
$ 12,200 00	$ 12,200 00			$ 12,200 00	
			Expenses:		
145 00	145 00		Office supplies, etc.	145 00	
7,000 00	7,000 00		Fuel, light, water, etc.	7,500 00	
2,500 00	2,500 00		Maintenance and repairs of buildings, grounds, etc.	5,000 00	
1,000 00	1,000 00		Furniture and fixtures	1,000 00	
14,000 00	14,000 00		Provisions, etc.	15,000 00	
3,500 00	3,500 00		Clothing, etc.	3,500 00	
500 00	500 00		Medical and surgical supplies	500 00	
600 00	600 00		Transportation of inmates	600 00	
800 00	800 00		Feed for live stock	1,000 00	
700 00	700 00		Incidentals and contingencies	700 00	
$ 42,945 00	$ 42,945 00		Total of Vote No. 217		47,145
			Carried forward		$ 936,669

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
			Brought forward		$ 936,669 00
			GRANTS TO HOSPITALS AND CHARITIES		
$ 450,000 00	$ 450,000 00	218.	Statutory grants to Hospitals	$400,000 00	
35,000 00	35,000 00	219.	Special grants to Hospitals	35,000 00	
6,000 00	6,000 00	220.	Grants to Refuge Homes, Aid Societies, etc.	6,000 00	
25,000 00	25,000 00	221.	In aid of destitute poor and sick	25,000 00	
10,000 00	10,000 00	222.	In aid of Resident Physicians	10,000 00	
1,250 00	2,250 00	223.	Burial of indigent persons	2,250 00	
$ 527,250 00	$ 528,250 00		Total, Grants to Hospitals and Charities		478,250 00
		224.	KING'S PRINTER.		
			Salaries:		
$ 2,820 00	$ 2,820 00		King's Printer and Comptroller of Stationery	$ 2,820 00	
2,100 00	2,100 00		Chief Clerk	2,100 00	
1,536 00	1,536 00		Clerk and Stenographer	1,080 00	
1,500 00	1,600 00		Cost Accountant	1,600 00	
960 00	1,080 00		Clerk	1,080 00	
1,500 00	375 00		Accountant	.....	
.....	585 00		Junior Clerk	780 00	
1,500 00	1,500 00		Storekeeper	1,500 00	
1,272 00	1,272 00		Mail Clerk	1,272 00	
1,272 00	1,272 00		Stockman	1,272 00	
1,020 00	1,140 00		Packer	1,140 00	
360 00	360 00		Messenger	360 00	
100,132 48	100,132 48		Sundry employees	100,132 48	
$ 115,972 48	$ 115,772 48			$115,136 48	
			Expenses:		
1,750 00	2,250 00		Office supplies, etc.	2,250 00	
25 00	25 00		Travelling expenses, etc.	25 00	
35,000 00	67,000 00		Printing-paper, materials, and incidentals	52,000 00	
7,000 00	7,000 00		New machinery, type, maintenance of plant, repairs, etc.	5,000 00	
30,000 00	43,000 00		Stationery, etc.	43,000 00	
$ 189,747 48	$ 235,047 48		Total of Vote No. 224		217,411 48
		225.	CIVIL SERVICE COMMISSION.		
			Salaries:		
$ 4,120 00	$ 4,120 00		Commissioner	$ 4,120 00	
.....	.....		Chief Clerk	1,800 00	
1,600 00	1,600 00		Clerk	.....	
900 00	900 00		Stenographer and Clerk	900 00	
870 00	870 00		Stenographer	870 00	
870 00	870 00		Stenographer	.....	
840 00	840 00		Stenographer	840 00	
$ 9,200 00	$ 9,200 00		*Carried forward*	$ 8,530 00	$1,632,330 48

Fiscal Year, 1920-21. Original Estimates approved by Legislature.	Fiscal Year, 1920-21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921-22.
			DEPARTMENT OF THE PROVINCIAL SECRETARY—*Continued.*		
		225.	CIVIL SERVICE COMMISSION—*Continued.*		
$ 9,200 00	$ 9,200 00		*Brought forward*	$ 8,530 00	$1,632,330 48
			Salaries—*Continued.*		
840 00	840 00		Stenographer	.....	
1,560 00	1,560 00		Two Stenographers @ $780 each	1,560 00	
500 00	500 00		Temporary assistance	500 00	
$ 12,100 00	$ 12,100 00			$ 10,590 00	
2,000 00	2,000 00		*Less* chargeable to departments for substitute work	1,500 00	
$ 10,100 00	$ 10,100 00			$ 9,090 00	
			Expenses:		
2,050 00	2,050 00		Office supplies, fixtures, etc.	1,800 00	
1,000 00	1,000 00		Travelling expenses, etc.	1,250 00	
1,000 00	1,000 00		Advertising	1,000 00	
500 00	500 00		Examinations	1,200 00	
1,000 00	1,000 00		Contingencies	1,000 00	
$ 15,650 00	$ 15,650 00		Total of Vote No. 225		15,340 00
			MISCELLANEOUS VOTES.		
$ 20,000 00	$ 70,000 00	226.	Registration of voters	$ 10,000 00	
10,000 00	10,000 00	227.	Royal Commissions	10,000 00	
1,000 00	1,000 00	228.	Grant to City of Greenwood	1,000 00	
4,500 00	4,500 00	...	Grant to City of Phoenix	.....	
12,000 00	12,000 00	229.	Grant to City of Rossland	12,000 00	
12,500 00	12,500 00	230.	Grant to Pacific North-west Tourist Association	12,500 00	
250,000 00	250,000 00	231.	Grant for patriotic purposes, Returned Soldiers' Aid Commission, etc.	100,000 00	
5,000 00	5,000 00	...	Imperial Press Conference	.....	
70,000 00	70,000 00	232.	Superannuation	70,000 00	
6,000 00	6,000 00	233.	Gratuities under section 45, "Civil Service Act"	4,500 00	
25,000 00	50,000 00	234.	Assessment on Class 13, Workmen's Compensation Board	50,000 00	
16,000 00	16,000 00	235.	Salaries of members, Workmen's Compensation Board	16,500 00	
38,000 00	38,000 00	236.	Industrial School and Subnormal Boys' School: Salaries, maintenance, furnishing, etc.	100,000 00	
.....	.....	237.	Tranquille Sanatorium: Salaries, maintenance, repairs to buildings, etc., and liquidation of outstanding accounts	355,000 00	
10,000 00	10,000 00	239.	Contingencies and incidentals	7,000 00	
$ 480,000 00	$ 555,000 00		Total, Miscellaneous Votes		748,500 00
$ 2,013,086 48	$ 2,131,866 48		Total, Department of the Provincial Secretary		$2,396,170 48

FISCAL YEAR, 1920–21.		No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF PUBLIC WORKS.		
		240.	MINISTER'S OFFICE.		
			Salaries:		
$ 6,000 00	$ 6,000 00		Minister	$ 6,000 00	
2,040 00	2,040 00		Secretary	2,040 00	
$ 8,040 00	$ 8,040 00			$ 8,040 00	
			Expenses:		
1,000 00	1,000 00		Office supplies, etc.	1,000 00	
2,000 00	2,000 00		Travelling expenses, etc.	2,000 00	
$ 11,040 00	$ 11,040 00		Total of Vote No. 240		$ 11,040 00
		241.	ADMINISTRATION.		
			Salaries:		
$ 4,000 00	$ 4,000 00		Deputy Minister	$ 4,000 00	
5,000 00	5,000 00		Public Works Engineer	4,000 00	
3,240 00	3,240 00		Assistant Public Works Engineer	3,360 00	
			Draughting Office.		
3,120 00	3,120 00		Office Engineer	3,120 00	
2,400 00	2,400 00		Designing Engineer	.....	
2,100 00	2,100 00		Chief Draughtsman	2,100 00	
2,100 00	2,100 00		Draughtsman	2,100 00	
1,800 00	1,800 00		Draughtsman	1,800 00	
1,200 00	1,200 00		Junior Draughtsman	1,200 00	
			Architect's Office.		
2,880 00	2,880 00		Supervising Architect	3,000 00	
2,100 00	2,100 00		Assistant Supervising Architect	2,100 00	
1,720 00	1,720 00		Draughtsman	1,720 00	
			Accountant's Office.		
2,760 00	2,760 00		Chief Clerk and Accountant	2,760 00	
1,780 00	1,780 00		Assistant Accountant	1,780 00	
1,720 00	1,720 00		Clerk	1,720 00	
1,620 00	1,620 00		Clerk	1,620 00	
1,452 00	1,452 00		Clerk	1,452 00	
1,452 00	1,452 00		Clerk	1,452 00	
			General Office.		
1,720 00	1,720 00		Senior Clerk	1,720 00	
1,440 00	1,500 00		Filing Clerk	1,500 00	
960 00	960 00		Junior Clerk	720 00	
600 00	600 00		Junior Clerk	540 00	
1,080 00	1,080 00		Stenographer	1,080 00	
1,020 00	1,020 00		Stenographer	1,020 00	
1,020 00	1,020 00		Stenographer	1,020 00	
$ 50,284 00	$ 50,344 00		*Carried forward*	$ 46,884 00	$ 11,040 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF PUBLIC WORKS—*Continued.*		
		241.	ADMINISTRATION—*Continued.*		
$ 50,284 00	$ 50,344 00		*Brought forward*	$ 46,884 00	$ 11,040 00
			Salaries—*Continued.*		
			General Office—Continued.		
870 00	870 00		Stenographer	780 00	
.....	.....		Stenographer	780 00	
1,000 00	2,760 00		Temporary assistance	560 00	
			Superintendent of Bridges and Buildings.		
3,000 00	3,000 00		Salary	3,120 00	
			Mechanical Superintendent.		
2,100 00	2,100 00		Salary	2,100 00	
$ 57,254 00	$ 59,074 00			$ 54,224 00	
			Expenses:		
4,000 00	5,200 00		Office supplies, etc.	7,200 00	
3,500 00	3,500 00		Travelling expenses, etc.	3,500 00	
$ 64,754 00	$ 67,774 00		Total of Vote No. 241		64,924 00
		242.	MAINTENANCE OF PARLIAMENT BUILDINGS AND GROUNDS.		
			Salaries:		
			Telegraph Operator.		
$ 1,200 00	$ 1,200 00		Operator	$ 1,200 00	
540 00	540 00		Messenger	540 00	
			Garage.		
1,680 00	1,680 00		Chauffeur-Mechanic	1,500 00	
			Boiler-room.		
1,860 00	1,860 00		Engineer	1,860 00	
1,560 00	1,560 00		First Assistant Engineer	1,560 00	
1,380 00	1,380 00		Second Assistant Engineer	1,380 00	
1,380 00	1,380 00		Third Assistant Engineer	1,380 00	
1,680 00	1,680 00		Electrician	1,680 00	
1,620 00	1,620 00		Plumber	1,620 00	
			Carpenter-shop.		
1,500 00	1,500 00		Head Carpenter	1,500 00	
1,440 00	1,440 00		Carpenter	1,440 00	
1,440 00	1,440 00		Carpenter	1,440 00	
$ 17,280 00	$ 17,280 00		*Carried forward*	$ 17,100 00	$ 75,964 00

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF PUBLIC WORKS—*Continued.*		
		242.	MAINTENANCE OF PARLIAMENT BUILDINGS AND GROUNDS—*Continued.*		
17,280 00	$ 17,280 00		*Brought forward*	$ 17,100 00	$ 75,964 00
			Salaries—*Continued.*		
			Janitors.		
1,500 00	1,600 00		Chief Janitor	1,600 00	
1,260 00	1,320 00		Janitor	1,320 00	
12,000 00	12,000 00		Ten Janitors @ $1,200 each	12,000 00	
4,680 00	4,680 00		Four Janitors @ $1,170 each	4,680 00	
1,170 00	1,170 00		Janitor	.....	
1,170 00	1,200 00		Janitor	1,200 00	
1,140 00	1,200 00		Janitor	1,200 00	
1,140 00	1,170 00		Janitor	1,170 00	
1,140 00	1,140 00		Janitor	1,140 00	
1,140 00	1,170 00		Janitor	1,170 00	
1,140 00	1,170 00		Janitor	1,170 00	
1,140 00	1,140 00		Janitor	1,140 00	
1,140 00	1,140 00		Janitor	1,140 00	
.....	.....		Janitor	1,140 00	
1,200 00	1,200 00		Watchman	1,200 00	
1,170 00	1,170 00		Watchman	1,170 00	
1,140 00	1,170 00		Watchman	1,170 00	
1,140 00	1,140 00		Watchman	1,140 00	
1,200 00	1,200 00		Usher	1,200 00	
540 00	540 00		Assistant Usher	360 00	
600 00	1,600 00		Temporary assistance	1,600 00	
			Grounds.		
1,440 00	1,440 00		Chief Gardener	1,440 00	
55,470 00	$ 56,840 00			$ 56,450 00	
			Expenses:		
14,000 00	14,000 00		Fuel, light, water, etc.	20,400 00	
32,418 00	32,418 00		Maintenance and repairs of buildings	30,400 00	
10,836 00	10,836 00		Gardening and grounds, including statue	11,000 00	
1,700 00	1,700 00		Pictures of Their Majesties the King and Queen..	.....	
2,000 00	2,000 00		Scavenging, cleaning, and Janitors' supplies, etc...	2,600 00	
7,500 00	7,500 00		Telephones	7,500 00	
1,040 00	1,040 00		Taxes	1,050 00	
.....	.....		Insurance	11,100 00	
1,700 00	1,700 00		Garage	2,200 00	
500 00	500 00		Miscellaneous	500 00	
127,164 00	$ 128,534 00		Total of Vote No. 242		143,200 00
			Carried forward		$ 219,164 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
			DEPARTMENT OF PUBLIC WORKS—*Continued.*		
			Brought forward		$ 219,164
		243.	MAINTENANCE OF GOVERNMENT HOUSE AND GROUNDS.		
			Salaries:		
$ 2,400 00	$ 2,400 00		Private Secretary	$ 2,400 00	
1,200 00	1,200 00		Chief Gardener	1,200 00	
$ 3,600 00	$ 3,600 00			$ 3,600 00	
			Expenses:		
2,700 00	2,700 00		Fuel, light, water, etc.	3,200 00	
4,600 00	4,600 00		Maintenance, repairs, and furniture	4,600 00	
7,500 00	7,500 00		Gardening and grounds	8,600 00	
500 00	500 00		Ground-rent and taxes	500 00	
.....	.....		Secretary's house-rent	720 00	
.....	.....		Insurance	700 00	
500 00	500 00		Miscellaneous	900 00	
$ 19,400 00	$ 19,400 00		Total of Vote No. 243		22,820
		244.	DISTRICT ENGINEERS.		
			Salaries:		
$ 18,000 00	$ 18,000 00		Six Engineers @ $3,120 each	$ 18,720 00	
2,880 00	2,880 00		Engineer	3,000 00	
2,880 00	2,880 00		Engineer	3,000 00	
2,520 00	2,520 00		Engineer	2,880 00	
1,500 00	1,500 00		Clerk	.....	
1,500 00	1,500 00		Five Clerks @ $1,500 each	7,500 00	
1,500 00	1,500 00		Clerk	1,440 00	
1,440 00	1,440 00		Clerk	1,440 00	
.....	.....		Clerk	1,200 00	
960 00	1,040 00		Clerk	960 00	
420 00	420 00		Stenographer	900 00	
$ 39,600 00	$ 39,680 00			$ 41,040 00	
			Expenses:		
6,900 00	6,900 00		Office supplies, etc.	10,300 00	
11,500 00	11,500 00		Travelling expenses, etc.	14,700 00	
$ 58,000 00	$ 58,080 00		Total of Vote No. 244		66,040
		245.	STEAM-BOILER INSPECTION.		
			Salaries:		
$ 3,900 00	$ 4,020 00		Chief Inspector	$ 4,020 00	
3,000 00	3,120 00		Inspector	3,120 00	
3,000 00	3,120 00		Inspector	3,120 00	
$ 9,900 00	$ 10,260 00		*Carried forward*	$ 10,260 00	$ 308,02

FISCAL YEAR, 1920–21. Original Estimates approved by Legislature.	Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year, 1921–22.
			DEPARTMENT OF PUBLIC WORKS—*Continued.*		
		245.	STEAM-BOILER INSPECTION—*Continued.*		
9,900 00	$ 10,260 00		*Brought forward*	$ 10,260 00	$ 308,024 00
			Salaries—*Continued.*		
3,000 00	3,060 00		Inspector	3,060 00	
3,000 00	3,000 00		Inspector	3,000 00	
2,760 00	2,760 00		Inspector	2,760 00	
2,700 00	2,700 00		Inspector	2,700 00	
2,700 00	2,700 00		Inspector	2,700 00	
2,640 00	2,640 00		Inspector	2,640 00	
2,580 00	2,580 00		Inspector	2,580 00	
2,520 00	2,520 00		Inspector	2,520 00	
2,520 00	2,520 00		Inspector	2,520 00	
.....	1,354 00		Inspector	2,400 00	
1,320 00	1,520 00		Engineer, launch	1,680 00	
1,152 00	1,260 00		Clerk	1,260 00	
960 00	960 00		Stenographer	960 00	
900 00	900 00		Stenographer	.....	
870 00	870 00		Stenographer	870 00	
840 00	840 00		Stenographer	840 00	
.....	.....		Stenographer	780 00	
.....	472 00		Temporary assistance	500 00	
40,362 00	$ 42,916 00			$ 44,030 00	
			Expenses:		
3,645 00	3,645 00		Office supplies, etc.	4,300 00	
8,000 00	8,000 00		Travelling expenses, etc.	9,600 00	
2,500 00	2,500 00		Launch (maintenance and supplies)	2,500 00	
300 00	300 00		Testing instruments, chemicals, etc.	180 00	
.....	.....		New launch to replace "Adanac"	15,000 00	
54,807 00	$ 57,361 00		Total of Vote No. 245		75,610 00
		246.	"ELECTRICAL ENERGY INSPECTION ACT."		
			Salaries:		
2,880 00	$ 2,880 00		Inspector	$ 3,000 00	
2,100 00	2,100 00		Assistant Inspector	2,220 00	
420 00	420 00		Stenographer ($840, half-salary charged to Fire Inspection)	420 00	
5,400 00	$ 5,400 00			$ 5,640 00	
			Expenses:		
1,150 00	1,150 00		Office supplies, etc.	850 00	
1,800 00	1,800 00		Travelling expenses, etc.	2,100 00	
8,350 00	$ 8,350 00		Total of Vote No. 246		8,590 00
			Carried forward		$ 392,224 00

Fiscal Year, 1920–21. Original Estimates approved by Legislature.	Fiscal Year, 1920–21. Increased under Special Warrants, etc.	No. of Vote.	SERVICE.		Fiscal Year 1921–22
			DEPARTMENT OF PUBLIC WORKS—*Continued.*		
			Brought forward		$ 392,22
		247.	"FACTORIES ACT."		
			Salaries:		
$ 2,640 00	$ 2,640 00		Inspector	$ 2,700 00	
2,220 00	2,220 00		Assistant Inspector	2,280 00	
1,200 00	1,200 00		Assistant Inspector	1,300 00	
48 00	48 00		Temporary assistance	48 00	
$ 6,108 00	$ 6,108 00			$ 6,328 00	
			Expenses:		
310 00	310 00		Office supplies, etc.	400 00	
2,200 00	2,200 00		Travelling expenses, etc.	2,200 00	
$ 8,618 00	$ 8,618 00		Total of Vote No. 247		8,92
		248.	ROADS, STREETS, BRIDGES, AND WHARVES.		
$ 2,197,600 00	$ 2,197,600 00		Maintenance and repairs	$2,241,100 00	
$ 2,197,600 00	$ 2,197,600 00		Total of Vote No. 248		2,241,10
		249.	STEAMBOATS, FERRIES, AND BRIDGE-TENDERS.		
$ 195,490 00	$ 195,490 00		Subsidies and maintenance	$261,556 00	
$ 195,490 00	$ 195,490 00		Total of Vote No. 249		261,55
			MISCELLANEOUS.		
.....	$ 5,000 00		S.W. No. 5—"Rule of the Road"		.....
$ 2,745,223 00	$ 2,757,247 00		Total, Department of Public Works		$2,903,80
			DEPARTMENT OF RAILWAYS.		
		250.	GENERAL OFFICE.		
			Salaries:		
$ 4,500 00	$ 4,500 00		Chief Engineer	$ 4,500 00	
2,760 00	2,760 00		Assistant Engineer	2,760 00	
3,000 00	3,000 00		Inspector of Rolling-stock and Equipment	$ 3,000 00	
2,400 00	2,400 00		Assistant Inspector of Rolling-stock and Equipment	2,400 00	
2,400 00	2,400 00		Assistant Inspector of Rolling-stock and Equipment	2,400 00	
1,600 00	1,600 00		Chief Clerk	1,600 00	
870 00	870 00		Stenographer	870 00	
870 00	870 00		Stenographer	870 00	
.....	.....		Temporary assistance	200 00	
$ 18,400 00	$ 18,400 00		*Carried forward*	$ 18,600 00	

Fiscal Year, 1920-21.		No. of Vote.	SERVICE.		Fiscal Year, 1921-22.
Original Estimates approved by Legislature.	Increased under Special Warrants, etc.				
			DEPARTMENT OF RAILWAYS—*Continued.*		
		250.	GENERAL OFFICE—*Continued.*		
18,400 00	$ 18,400 00		*Brought forward*	$ 18,600 00	
			Expenses:		
2,500 00	2,500 00		Office supplies, etc.	2,000 00	
4,000 00	4,000 00		Travelling expenses, etc.	4,000 00	
24,900 00	$ 24,900 00		Total of Vote No. 250		$ 24,600 00
		251.	FRASER RIVER BRIDGE, NEW WESTMINSTER.		
25,000 00	$ 50,000 00		Salaries, maintenance and repairs	$ 50,000 00	
25,000 00	$ 50,000 00		Total of Vote No. 251		50,000 00
49,900 00	$ 74,900 00		Total, Department of Railways		$ 74,600 00

Original Estimates approved by Legislature.	No. of Vote.	SERVICE.		Fiscal Year 1921–22.
		CAPITAL EXPENDITURES.		
	252.	Sinking Funds:		
		"Loan Acts, 1891, 1893, 1895, 1899, and 1902"—1 per cent. per annum on Inscribed Stock, £2,045,760 ($9,921,936), payable to B.C. Loan Trustees in London, England, 30th June and		
$ 99,219 36		31st December, 1921, for investment	$ 99,219 36	
119,050 00		"Loan Act, 1914"—annual payment due 1st April, 1921	119,050 00	
238,908 00		"Loan Act, 1915"—annual payment due 1st December, 1921	238,908 00	
77,500 00		"Loan Act, 1916" (Amendment, 1917)—annual payment due 1st April, 1921	77,500 00	
154,505 00		"Loan Act, 1916"—annual payment due 1st July, 1921	154,505 00	
86,000 00		"Loan Act, 1916"—annual payment due 2nd July, 1921	86,000 00	
5,740 00		"Loan Act, 1917"—annual payment due 1st April, 1921	5,740 00	
9,072 00		"Loan Act, 1917"—annual payment due 16th May, 1921	9,072 00	
2,870 00		"Loan Act, 1917"—annual payment due 1st November, 1921	2,870 00	
2,870 00		"Loan Act, 1917"—annual payment due 1st December, 1921	2,870 00	
8,610 00		"Loan Act, 1917"—annual payment due 1st December, 1921	8,610 00	
2,870 00		"Loan Act, 1917"—annual payment due 1st December, 1921	2,870 00	
86,000 00		"Loan Act, 1918"—annual payment due 5th March, 1922	86,000 00	
22,680 00		"Better Housing Act, 1919"—annual payment due 31st December, 1921	41,000 00	
7,867 00		"Dyking Debentures"—annual payment due 1st July, 1921	7,867 00	
260,000 00		Investment of dividends	305,000 00	
$1,183,761 36		Total of Vote No. 252		$1,247,08
	253.	Pacific Great Eastern Railway Company—Interest on Guaranteed Bonds due		
907,200 00		15th July, 1921, and 15th January, 1922		773,88
9,700 00	254.	British Columbia House, London, England—Instalment on mortgage		9,70
50,000 00	255.	Songhees Reserve		50,00
200,000 00	256.	Johnson Street Bridge (re-vote)		200,00
	257.	Industrial School and Boys' Subnormal School—Buildings, grounds, equip-		
250,000 00		ment, etc.		99,00
81,000 00	258.	Mental Hospitals—Buildings, grounds, equipment, etc.		237,10
.....	259.	Tranquille Sanatorium—Buildings, grounds, equipment, etc.		50,00
175,000 00	....	Technical School, Vancouver		.....
.....	260.	Deaf, Dumb, and Blind School, Point Grey		25,00
100,000 00	261.	Government Buildings, Prince Rupert		200,00
12,000 00	262.	Government Buildings, Pouce Coupe		25,00
20,000 00	263.	Government Buildings, Williams Lake		23,00
3,500 00	....	Government Buildings, Barkerville		.....
13,500 00	....	Lock-ups, Bridge Crossing, Clinton and Kelowna		.....
.....	264.	Lock-ups, Alice Arm, Hanceville, and Kimberly		14,00
5,000 00	265.	Lock-ups and Quarters, at other points if required		5,00
5,000 00	....	Warden's Residence, Oakalla Prison Farm		.....
18,000 00	....	Forestry Offices and Rangers' Stations		.....
116,300 00	....	Roads, Streets, Bridges, and Wharves		.....
300,000 00	....	Main Highways, Industrial and Settlement Roads		.....
$3,449,961 36		Total, Capital Expenditures		$2,958,7

DETAILED STATEMENT OF VOTE No. 98.

SALARIES OF TEACHERS IN ASSISTED SCHOOLS.

lary, 0–21.	School.	Salary, 1921–22.	Salary, 1920–21.	School.	Salary, 1921–22.
00 00	Adelphi	$ 960 00	$1,020 00	Bonaparte, North	$1,020 00
20 00	Ainsworth	1,020 00	1,020 00	Bonaparte Valley	Closed.
80 00	Albert Canyon	1,080 00	940 00	Boston Bar	960 00
00 00	Albert Head	900 00	1,020 00	Boswell	1,020 00
40 00	Alexander Manson	1,140 00	1,020 00	Boundary Falls	1,020 00
40 00	Alexandria	1,140 00	960 00	Bowen Island	960 00
40 00	Alice Arm	1,140 00	1,080 00	Bowie	1,080 00
20 00	Alice Siding	1,020 00	1,080 00	Box Lake	1,080 00
80 00	Allenby, Principal	1,140 00	1,080 00	Braeside	1,080 00
60 00	Allenby, 2nd Division	960 00	1,050 00	Bridesville	1,050 00
60 00	Allen Grove	960 00	1,050 00	Bridge Lake	1,050 00
50 00	Anarchist Mountain	1,050 00	1,260 00	Brilliant, Principal	1,260 00
20 00	Anderson	1,320 00	1,200 00	Brilliant, 2nd Division	1,200 00
60 00	Anderson Creek	960 00	1,140 00	Brilliant, 3rd Division	1,140 00
50 00	Annable	1,050 00	1,140 00	Brilliant, 4th Division	1,140 00
80 00	Appledale	1,080 00	1,080 00	Brisco	1,080 00
20 00	Argenta	1,020 00	1,260 00	Britannia Beach, Principal	1,200 00
80 00	Arrow Park, West	1,080 00	1,080 00	Britannia Beach, 2nd Division	1,020 00
00 00	Ashton Creek	1,000 00	960 00	Britannia Beach, 3rd Division	Closed.
20 00	Aspen Grove	1,020 00	1,080 00	Britannia Mine	1,140 00
80 00	Athalmer	1,080 00	1,020 00	Brookmere	1,020 00
40 00	Balfour	1,140 00	1,020 00	Brown Creek	1,080 00
80 00	Balmoral	980 00	1,100 00	Buckley Bay	1,100 00
00 00	Bamfield	1,000 00	1,050 00	Bulkley, North	1,080 00
00 00	Barkerville	1,200 00	1,050 00	Bulkley, South	1,080 00
60 00	Barnston Island	960 00	1,260 00	Burns Lake, Principal	1,260 00
20 00	Barriere River	1,020 00	1,080 00	Burns Lake, 2nd Division	1,080 00
20 00	Barriere Valley	1,020 00	960 00	Cahilty	960 00
00 00	Bear Creek	960 00	1,020 00	Caithness	1,020 00
50 00	Beaton	1,050 00	1,000 00	Campbell Range	1,000 00
80 00	Beaverley	1,080 00	1,140 00	Camp Lister, Principal	1,140 00
00 00	Beaver Lake	1,200 00	1,000 00	Camp Lister, 2nd Division	1,000 00
20 00	Belford	1,020 00	900 00	Canford	900 00
40 00	Bella Coola	1,140 00	1,140 00	Canim Lake	1,140 00
00 00	Bella Coola, Lower	1,140 00	1,140 00	Cape Scott	1,140 00
60 00	Bellevue	960 00	980 00	Carlin Siding	980 00
00 00	Berrydale	Closed.	960 00	Carroll's Landing	960 00
40 00	Big Bar	1,140 00	1,260 00	Cartier	1,260 00
00 00	Big Bar Mountain	1,200 00	1,050 00	Castledale	1,050 00
40 00	Big Bar, Upper	1,140 00	1,200 00	Castlegar	1,200 00
40 00	Big Eddy	1,140 00	1,050 00	Cedarvale	1,050 00
40 00	Big Lake	1,140 00	1,200 00	Champion Creek	1,200 00
00 00	Birchbank	1,000 00	960 00	Chase Creek, Lower	960 00
50 00	Blaeberry	1,050 00	900 00	Chaumox	900 00
60 00	Blind Bay	960 00	1,140 00	Chief Lake	1,140 00
20 00	Blubber Bay	1,020 00	1,080 00	Chilco	1,080 00
50 00	Blueberry Creek	1,050 00	1,200 00	Chilcotin	1,200 00
20 00	Blue Ridge	1,020 00	1,200 00	Chimney Creek	1,200 00
50 00	Blue River	1,050 00	1,080 00	Christian Valley	1,080 00

DETAILED STATEMENT OF VOTE No. 98—*Continued.*

SALARIES OF TEACHERS IN ASSISTED SCHOOLS—*Continued.*

Salary, 1920–21.	School.	Salary, 1921–22.
$1,000 00	Chu Chua	$1,000 00
1,020 00	Clearwater	1,020 00
900 00	Clifton	900 00
1,000 00	Clo-oose	1,000 00
1,020 00	Coalmont	1,020 00
1,140 00	Cokato	1,140 00
1,140 00	Collishaw	1,140 00
1,080 00	Coltern	1,080 00
1,080 00	Columbia Gardens	1,080 00
900 00	Concord	900 00
1,020 00	Cooper Creek	1,020 00
1,080 00	Copper Mountain, Principal	1,140 00
960 00	Copper Mountain, 2nd Division	960 00
1,020 00	Cortes Island	1,020 00
960 00	Craigellachie	960 00
960 00	Cranberry Marsh	960 00
1,000 00	Crawford Creek	1,000 00
960 00	Criss Creek	960 00
1,080 00	Crow's Nest	1,080 00
1,020 00	Cultus Lake	1,020 00
1,020 00	Curzon	1,020 00
1,320 00	Dawson Creek	1,320 00
1,020 00	Decker Lake	1,050 00
1,020 00	Deep Creek	1,020 00
1,080 00	Deer Park	1,080 00
1,080 00	Demars, West	1,080 00
1,320 00	Discovery	1,320 00
900 00	Divide	900 00
1,140 00	Dome Creek	1,140 00
960 00	Doriston	960 00
1,140 00	Dragon Lake	1,140 00
1,080 00	Driftwood Creek	1,080 00
1,000 00	Duhamel	1,000 00
1,080 00	Dunster	1,080 00
950 00	Eagle Bay	960 00
1,020 00	Eagle Valley	1,020 00
1,080 00	Edgewood	1,080 00
1,020 00	Eholt	1,020 00
1,140 00	Elk Bridge	1,140 00
960 00	Elk Prairie	Closed.
1,080 00	Ellesby	1,080 00
960 00	Elphinstone Bay	960 00
1,080 00	Endako	1,080 00
1,080 00	Engen	1,080 00
1,000 00	Erie	1,020 00
960 00	Essondale	960 00
1,050 00	Fairview	1,050 00
1,020 00	Falkland	1,020 00
960 00	False Bay	960 00
$ 960 00	Fauquier	$ 96
1,020 00	Ferguson	1,02
1,080 00	Fife	1,08
1,050 00	Firvale	1,05
1,020 00	Fir Valley	1,02
1,080 00	Fire Valley	1,08
980 00	Fish Lake Road	98
1,140 00	Flagstone	1,14
1,020 00	Floral Creek	1,02
1,080 00	Florence Mine	1,08
1,140 00	Forest Grove	1,14
1,140 00	Fort Fraser	1,14
1,440 00	Fort George, Principal	1,44
1,200 00	Fort George, 2nd Division	1,20
1,380 00	Fort George, South, Principal	1,38
1,140 00	Fort George, South, 2nd Division	1,14
1,320 00	Fort St. John	1,32
1,020 00	Foster's Bar	1,02
1,140 00	Francois Lake	1,14
1,140 00	Francois Lake, South	1,14
900 00	Gabriola, East	90
900 00	Gabriola, North	90
900 00	Gabriola, South	90
1,080 00	Galena Bay	1,08
900 00	Galiano	90
900 00	Galiano, North	90
960 00	Gerrard	96
960 00	Gillis Bay	96
960 00	Gilpin	96
1,140 00	Giscome	1,14
1,080 00	Glacier	1,08
1,260 00	Glade, Principal	1,26
1,160 00	Glade, 2nd Division	1,16
900 00	Gladwin	90
1,140 00	Glencoe	1,14
960 00	Glenrosa	96
1,080 00	Glentanna	1,08
900 00	Gowland Harbour	90
960 00	Grandview Bench	96
960 00	Granite Bay	96
900 00	Gray Creek	90
1,020 00	Greer Valley	1,02
960 00	Half Moon Bay	96
1,080 00	Hall's Landing	1,08
1,050 00	Hanall	1,05
1,020 00	Hardwick Island	1,02
1,200 00	Harper's Camp	1,20
1,020 00	Harrogate	1,02
1,080 00	Harrop	1,08

DETAILED STATEMENT OF VOTE No. 98—*Continued.*

Salaries of Teachers in Assisted Schools—*Continued.*

Salary, 1920–21.	School.	Salary, 1921–22.
,080 00	—Hartley	Closed.
,200 00	—Hazelton	1,200 00
,140 00	—Hazelton, New	1,140 00
,050 00	—Heffley Creek	1,050 00
,000 00	—Heffley Creek, Upper	1,000 00
960 00	—Heffley Lake	Closed.
900 00	—Hendon	960 00
960 00	—Heriot Bay	960 00
,020 00	—Heywood's Corner	1,020 00
960 00	—Hidden Bay	Closed.
900 00	—Highland	900 00
,140 00	—Hilborn	1,140 00
,020 00	—Hilltop	1,020 00
960 00	—Hilton	960 00
960 00	—Hope Station	960 00
960 00	—Hornby Island	960 00
,080 00	—Horse Creek	1,080 00
,140 00	—Hosmer	1,140 00
,100 00	—Houston	1,100 00
,080 00	—Hulatt	1,080 00
,020 00	—Hupel	1,020 00
,080 00	—Huscroft	1,080 00
,200 00	—Hutton	1,200 00
960 00	—Inglee	Closed.
960 00	—Ingram Mountain	960 00
,080 00	—Invermere	1,080 00
1,050 00	—Inverness	Closed.
1,140 00	—Ioco, Principal	1,260 00
960 00	—Ioco, 2nd Division	1,080 00
960 00	—Ioco, 3rd Division	960 00
960 00	—Irvine's Landing	960 00
900 00	—Isabella Point	900 00
960 00	—James Island	960 00
960 00	—Jordan River	960 00
960 00	—Kaleden	960 00
1,020 00	—Kaleva	1,020 00
1,020 00	—Kedleston	1,020 00
960 00	—Keefers	960 00
1,080 00	—Kettle River, North	1,020 00
1,080 00	—Kettle Valley	1,080 00
1,000 00	—Kildonan	1,000 00
1,020 00	—Killarney	1,020 00
1,200 00	—Kimberley, Principal	1,200 00
1,080 00	—Kimberley, 2nd Division	1,080 00
1,020 00	—Kingcome Inlet	1,020 00
1,000 00	—Kingsgate	1,020 00
1,000 00	—Kinnaird	1,000 00
1,080 00	—Kitchener	1,080 00
960 00	—Knutsford	960 00
$1,020 00	—Koch Siding	$1,020 00
1,200 00	—Krestova	1,200 00
960 00	—Lac du Bois	960 00
960 00	—Lackenby	960 00
1,140 00	—Lac la Hache	1,140 00
960 00	—Lake Buntzen	960 00
1,080 00	—Lake District	1,080 00
1,020 00	—Lake Evelyn	1,020 00
1,320 00	—Landry	1,320 00
960 00	—Lang Bay	960 00
1,020 00	—Lawn Hill	1,080 00
1,080 00	—Lee	1,080 00
960 00	—Lee Creek	960 00
1,050 00	—Little Fort	1,050 00
1,080 00	—Longworth	1,080 00
1,140 00	—Loos	1,140 00
1,100 00	—Lucerne	1,100 00
1,020 00	—Mabel Lake	1,020 00
960 00	—Magna Bay	960 00
1,260 00	—Malcolm Island, Principal	1,260 00
1,020 00	—Malcolm Island, 2nd Division	1,020 00
1,140 00	—Mapes	1,140 00
960 00	—Marshall	960 00
1,100 00	—Masset	1,100 00
1,020 00	—Mayook	1,020 00
1,020 00	—Meadow Spur	1,020 00
960 00	—Meadow Valley	960 00
1,200 00	—Meldrum Creek	1,200 00
1,140 00	—Metlakatla	Closed.
1,140 00	—Mill Creek, Principal	1,140 00
960 00	—Mill Creek, 2nd Division	960 00
1,140 00	—Miocene	1,140 00
960 00	—Mitchell Bay	960 00
960 00	—Moberly	Closed.
1,080 00	—Morrissey Mines	1,080 00
1,080 00	—Mount Ingersoll	1,080 00
1,080 00	—Moyase	1,080 00
1,140 00	—Moyie, Principal	1,080 00
960 00	—Moyie, 2nd Division	Closed.
1,080 00	—Mud River	1,080 00
960 00	—Myncaster	1,020 00
960 00	—Myrtle Point	960 00
1,140 00	—Macalister	1,140 00
900 00	—McConnell Creek	900 00
1,020 00	—McGuire	1,020 00
1,140 00	—MacKenzie	1,140 00
900 00	—McLure	900 00
1,080 00	—Nechako	1,080 00
1,080 00	—Needles	1,080 00

DETAILED STATEMENT OF VOTE No. 98—*Continued.*

SALARIES OF TEACHERS IN ASSISTED SCHOOLS—*Continued.*

Salary, 1920–21.	School.	Salary, 1921–22.
$1,080 00	Newgate	$1,020 00
1,020 00	Nickel Plate Mine	1,020 00
1,020 00	Nimpkish	1,020 00
960 00	Nimpkish River	960 00
1,000 00	Nine-mile Creek	Closed.
1,140 00	Nithi River	1,140 00
1,100 00	Noosatsum	1,120 00
1,020 00	Norwegian Creek	1,020 00
1,020 00	Okanagan Centre	1,020 00
960 00	Okeover Arm	960 00
1,020 00	Olalla	1,020 00
960 00	Olsen Lake	Closed.
1,200 00	150-Mile House	1,200 00
1,020 00	One-mile Creek	1,020 00
1,080 00	Orange Valley	1,080 00
1,100 00	Osland	1,100 00
960 00	Osoyoos	960 00
1,200 00	Outlook	1,200 00
960 00	Pachelqua	960 00
1,050 00	Pacific	1,050 00
1,000 00	Park's Siding	1,000 00
960 00	Parson	960 00
1,200 00	Pass Creek	1,200 00
960 00	Passmore	960 00
960 00	Paxton Valley	960 00
900 00	Pemberton Meadows	900 00
960 00	Pemberton Range	960 00
960 00	Pender Harbour	960 00
1,080 00	Penny	1,080 00
1,080 00	Perry Siding	1,080 00
960 00	Popcum	960 00
1,200 00	Port Alice, Principal	1,200 00
1,020 00	Port Alice, 2nd Division	1,020 00
1,140 00	Port Clements	1,140 00
1,020 00	Port Hardy	1,020 00
1,000 00	Port Renfrew	1,000 00
1,320 00	Pouce Coupe	1,320 00
1,320 00	Pouce Coupe, Central	1,320 00
1,320 00	Pouce Coupe, North	1,320 00
1,050 00	Princeton, East	1,050 00
1,080 00	Quatsino	1,080 00
1,140 00	Queen Charlotte	1,140 00
1,020 00	Raft River	1,020 00
980 00	Red Lake	980 00
960 00	Reiswig	960 00
1,080 00	Renata	1,080 00
900 00	Retreat Cove	Closed.
1,100 00	Rexmount	1,100 00
1,020 00	Riondel	1,020 00
$ 960 00	Roberts Creek, East	$ 960
1,050 00	Robin's Range	1,050
1,020 00	Rock Bay	1,020
1,140 00	Rock Creek	1,140
1,080 00	Rock Mountain	1,080
1,100 00	Roe Lake	1,100
1,000 00	Roosville	1,000
1,020 00	Rosebery	1,020
1,200 00	Rose Lake	1,200
1,080 00	Rose Valley	Close
1,050 00	Round Lake	1,050
1,020 00	Round Top	1,020
960 00	Saint Elmo	960
960 00	Salmon Bench	960
1,020 00	Salmon Valley	1,020
1,140 00	Sandspit	1,140
1,320 00	Saskatoon Creek	1,320
900 00	Saturna Island	900
960 00	Savary Island	960
940 00	Savona Road	940
1,020 00	Sayward	1,020
960 00	Sechelt	960
1,080 00	Seton Lake Creek	1,080
960 00	Seton Portage	960
1,000 00	Seventy-Mile House	1,000
1,080 00	Seymour Arm	1,080
900 00	Shirley	900
1,020 00	Shoreacres	1,020
1,020 00	Shuswap, North	1,020
1,020 00	Shutty Bench	1,020
1,080 00	Sicamous	1,080
960 00	Sinclair	960
1,020 00	Sirdar	1,020
1,140 00	Sisters Creek	1,140
1,100 00	Skidegate	Close
960 00	Skookumchuck	960
1,140 00	Soda Creek	1,140
960 00	Solsqua	1,020
900 00	Sooke, East	900
900 00	Sooke, North	900
960 00	Sorrento	960
1,200 00	Spencer	1,200
1,200 00	Springhouse	1,200
1,000 00	Sproat	1,000
1,050 00	Squam Bay	1,050
960 00	Squirrel Cove	1,000
1,080 00	Standard Mine	Close
1,200 00	Stewart	1,200
960 00	Stillwater	960

DETAILED STATEMENT OF VOTE No. 98—*Continued.*

SALARIES OF TEACHERS IN ASSISTED SCHOOLS—*Continued.*

Salary, 1920–21.	School.	Salary, 1921–22.
1,080 00	Stone Creek	$1,080 00
1,080 00	Stuart River	1,080 00
960 00	Sullivan Valley	960 00
1,020 00	Summit Lake	1,020 00
960 00	Sunnybrae	960 00
960 00	Sunnyside	960 00
1,050 00	Sunnyside Cannery	1,050 00
1,000 00	Sunnyside No. 2	1,000 00
1,020 00	Suquash	1,020 00
1,050 00	Surf Inlet Beach	Closed.
1,050 00	Surf Inlet Mine	1,050 00
1,320 00	Swan Lake	1,320 00
1,140 00	Swanson Bay	1,140 00
1,050 00	Swift Creek	1,050 00
960 00	Syringa Creek	960 00
980 00	Tappen Valley	980 00
1,320 00	Taylor's Flats	1,320 00
1,080 00	Tchesinkut Lake	1,080 00
1,380 00	Telegraph Creek	1,380 00
1,320 00	Tete Creek	1,320 00
900 00	Thetis Island	900 00
960 00	Three Forks	960 00
1,080 00	Thrums	1,080 00
1,020 00	Thurlow	1,020 00
1,020 00	Tonkawatla	1,020 00
1,050 00	Topley	1,050 00
960 00	Tranquille	960 00
980 00	Trapp Lake	980 00
1,000 00	Trinity Valley	1,000 00
1,140 00	Trout Lake	1,140 00
1,020 00	Tulameen	1,020 00
960 00	Turtle Valley	960 00
$ 960 00	Twin Butte	$ 960 00
1,020 00	Ucluelet	1,020 00
1,000 00	Ucluelet, East	1,000 00
1,140 00	Usk, Principal	1,200 00
1,050 00	Usk, 2nd Division	1,050 00
960 00	Valdes Island	960 00
1,020 00	Vavenby	1,020 00
1,050 00	Vinsulla	1,050 00
960 00	Waleach	960 00
960 00	Walhachin	960 00
1,000 00	Wanklyn	1,000 00
1,080 00	Wapta	1,080 00
1,080 00	Wasa	1,080 00
960 00	Watmore	960 00
1,020 00	Wellbore Channel	1,020 00
1,020 00	Westbank	1,020 00
960 00	Westsyde	1,020 00
960 00	Westview	960 00
1,020 00	Whaletown	1,020 00
1,000 00	White Lake	1,000 00
1,140 00	Williams Lake	1,260 00
1,020 00	William's Siding	1,020 00
1,140 00	Willow River	1,140 00
1,080 00	Wilmer	1,080 00
900 00	Wilson Creek	900 00
1,020 00	Windermere	1,020 00
960 00	Wire Cache	960 00
1,140 00	Wistaria	1,140 00
1,000 00	Woodville Road	1,000 00
1,140 00	Wynndel	1,140 00
1,080 00	Yahk	1,080 00
960 00	Yale	960 00

DETAILED STATEMENT OF VOTE No. 99.

SALARIES OF TEACHERS OF SCHOOLS IN ESQUIMALT & NANAIMO RAILWAY BELT.

900 00	Bainbridge	$ 900 00
960 00	Beaver Creek	960 00
960 00	Bench	960 00
1,140 00	Bevan, Principal	1,140 00
960 00	Bevan, 2nd Division	960 00
900 00	Bowser	900 00
1,260 00	Brechin, Principal	1,260 00
1,080 00	Brechin, 2nd Division	1,080 00
960 00	Brechin, 3rd Division	960 00
1,020 00	Cassidy, Principal	1,020 00
960 00	Cassidy, 2nd Division	960 00
900 00	Cedar, East	900 00
1,140 00	Cedar, North, Principal	1,260 00
$ 960 00	Cedar, North, 2nd Division	$1,020 00
960 00	Cedar, North, 3rd Division	960 00
1,020 00	Cedar, South	1,020 00
1,260 00	Chase River, Principal	1,260 00
1,080 00	Chase River, 2nd Division	1,080 00
960 00	Chase River, 3rd Division	960 00
960 00	Cherry Creek Valley	960 00
960 00	Cobble Hill	1,020 00
1,140 00	Comox, Principal	1,140 00
960 00	Comox, 2nd Division	960 00
1,140 00	Cowichan, Principal	1,140 00
960 00	Cowichan, 2nd Division	960 00
960 00	Cowichan Lake	960 00

DETAILED STATEMENT OF VOTE No. 99—*Continued.*

SALARIES OF TEACHERS OF SCHOOLS IN ESQUIMALT & NANAIMO RAILWAY BELT—*Continued.*

Salary, 1920–21.	School.	Salary, 1921–22.
$ 960 00	—Departure Bay	$ 960 00
1,140 00	—Diamond Crossing, Principal	1,140 00
960 00	—Diamond Crossing, 2nd Division	960 00
1,020 00	—Errington, Principal	1,140 00
900 00	—Errington, 2nd Division	960 00
1,260 00	—Extension, Principal	1,260 00
1,080 00	—Extension, 2nd Division	1,080 00
960 00	—Extension, 3rd Division	960 00
960 00	—Fanny Bay	960 00
960 00	—French Creek	960 00
1,020 00	—Gill	1,020 00
960 00	—Glenora	960 00
1,080 00	—Grantham	1,080 00
960 00	—Grant Mine	960 00
1,500 00	—Harewood, Principal	1,500 00
1,260 00	—Harewood, 2nd Division	1,260 00
1,140 00	—Harewood, 3rd Division	1,140 00
1,020 00	—Harewood, 4th Division	1,020 00
960 00	—Harewood, 5th Division	960 00
960 00	—Harewood, 6th Division	960 00
960 00	—Harewood, 7th Division	960 00
960 00	—Harewood, 8th Division	960 00
960 00	—Harewood, 9th Division	960 00
960 00	—Headquarters	960 00
960 00	—Hillier	960 00
960 00	—Koksilah	960 00
1,020 00	—Lazo	1,020 00
900 00	—Mayo	900 00
1,200 00	—Merville, Principal	1,200 00
1,020 00	—Merville, 2nd Division	1,020 00
960 00	—Mill Bay	1,020 00
1,140 00	—Minto, Principal	1,140 00
960 00	—Minto, 2nd Division	960 00
$ 900 00	—Montrose	Close
1,020 00	—Mountain	$1,020
960 00	—McGuigan	960
1,140 00	—Nanaimo Bay, Principal	1,140
1,000 00	—Nanaimo Bay, 2nd Division	1,000
960 00	—Nanoose Bay	960
900 00	—Nob Hill	960
1,140 00	—Northfield, Principal	1,140
960 00	—Northfield, 2nd Division	960
960 00	—Oyster	960
1,020 00	—Oyster, North	1,020
1,140 00	—Parksville, Principal	1,140
960 00	—Parksville, 2nd Division	960
960 00	—Puntledge	960
1,140 00	—Qualicum Beach, Principal	1,140
960 00	—Qualicum Beach, 2nd Division	960
960 00	—Qualicum, Little	960
900 00	—Red Gap	960
960 00	—Royston	960
960 00	—Sahtlam	960
1,080 00	—Sandwick	1,080
1,020 00	—Shawnigan	1,020
960 00	—Sylvania	960
1,200 00	—Union Bay, Principal	1,260
1,020 00	—Union Bay, 2nd Division	1,080
960 00	—Union Bay, 3rd Division	960
1,140 00	—Wellington, Principal	1,140
960 00	—Wellington, 2nd Division	960
1,380 00	—Wellington, South, Principal	1,380
1,200 00	—Wellington, South, 2nd Division	1,200
1,080 00	—Wellington, South, 3rd Division	1,080
960 00	—Wellington, South, 4th Division	960

1920-1921
SUPPLEMENTARY ESTIMATES OF EXPENDITURE

FOR THE

FISCAL YEAR ENDING 31ST MARCH, 1921

Main Estimates and Special Warrants Fiscal Year 1920–21.	No. of Vote.	SERVICE.			Fiscal Year, 1920–21.
$1,838,378 08	1.	PUBLIC DEBT.			
		Premium and Exchange			$ 56,000 00
109,170 00	2.	LEGISLATION.			
		Assistant Sergeant-at-Arms (additional), 8 weeks at $5 per week			40 00
		DEPARTMENT OF AGRICULTURE.			
40,638 00	5.	General Office—Temporary assistance		$ 500 00	
25,760 00	6.	Horticultural Branch—Travelling expenses		4,000 00	
62,172 00	12.	Live Stock Branch—Travelling expenses		3,000 00	
30,000 00	15.	Tubercular cattle — Compensation, supplies, temporary assistance, etc.		7,500 00	
9,000 00	18.	Farmers' Institutes, etc.		2,000 00	
7,000 00	19.	Women's Institutes, etc.		500 00	
					17,500 00
		DEPARTMENT OF THE ATTORNEY-GENERAL.			
11,310 00	35.	Attorney-General's Office—Office supplies, etc.		$ 1,000 00	
29,460 00	40.	Administration of "Prohibition Act":			
		Special Operators	$ 9,500 00		
		Liquor seizures and prosecutions	10,500 00		
				20,000 00	
12,084 00	41.	Sheriff's Office, Vancouver—Office supplies, etc.		750 00	
36,346 00	46.	Land Registry Office, Kamloops—Office supplies, etc.		500 00	
19,578 00	47.	Land Registry Office, Nelson—Office supplies, etc.		750 00	
44,448 00	48.	Land Registry Office, New Westminster—Office supplies, etc.		500 00	
66,760 00	50.	Land Registry Office, Vancouver—Office supplies, etc.		2,500 00	
52,268 00	51.	Land Registry Office, Victoria—Office supplies, etc.		1,350 00	
445 00	53.	Supreme and County Courts, Ladysmith—Office supplies, etc.		25 00	
6,902 00	55.	Supreme and County Courts, New Westminster—Office supplies, etc.		300 00	
34,527 00	57.	Supreme and County Courts, Vancouver—Office supplies, etc.		750 00	
28,492 00	58.	Supreme and County Courts, Victoria:			
		Salaries	$ 250 00		
		Office supplies, etc.	1,000 00		
		Maintenance and repairs	125 00		
				1,375 00	
27,975 00	64.	Girls' Industrial School—Expenses		2,000 00	
10,000 00	72.	Constitutional litigation and general law costs		11,500 00	
					43,300 00
		Carried forward			$ 116,840 00

Main Estimates and Special Warrants Fiscal Year 1920–21.	No. of Vote.	SERVICE.		Fiscal Year, 1920–21.
		Brought forward		$ 116,840 00
		DEPARTMENT OF EDUCATION.		
$ 25,342 00	79.	General Office—Office supplies, etc.	$ 2,000 00	
38,590 00	84.	Normal School, Vancouver—Maintenance	500 00	
40,700 50	85.	Normal School, Victoria—Fuel, water, etc.	1,000 00	
320,000 00	92.	School buildings	60,000 00	
11,000 00	96.	Conveying children to central schools	1,000 00	
				64,500 00
		DEPARTMENT OF FINANCE.		
51,900 00	103.	Controlling and Audit Branch—Expenses	$ 750 00	
84,450 00	106.	Agent-General's Office, London, England: British Columbia House—Alterations and repairs	3,810 26	
15,053 00	113.	Cranbrook Agency—Expenses	1,600 00	
8,222 00	117.	Fernie Agency—Expenses	700 00	
4,205 00	118.	Fort Fraser Agency—Expenses	300 00	
16,551 00	123.	Kamloops Agency:		
		Salaries	$ 675 00	
		Expenses	1,000 00	
			1,675 00	
16,009 00	128.	Nelson Agency—Temporary assistance	500 00	
25,315 00	129.	New Westminster Agency—Temporary assistance	600 00	
28,426 00	134.	Prince Rupert Agency:		
		Salaries	$ 250 00	
		Expenses	1,000 00	
			1,250 00	
15,086 00	140.	Smithers Agency:		
		Salaries	$ 250 00	
		Expenses	1,500 00	
			1,750 00	
15,822 00	144.	Vernon Agency—Expenses	2,100 00	
2,213 00	146.	Wilmer Sub-agency—Expenses	35 00	
2,500 00	148.	Sundry Sub-agencies—Expenses	140 00	
6,634 00	150.	Operation of the "Amusements Tax Act"—Expenses	676 36	
				15,886 62
		DEPARTMENT OF LANDS.		
179,705 00	165.	Expenses (including General Office and Branches):		
		Office supplies, etc.	$ 10,000 00	
231,000 00	174.	Land surveys	25,000 00	
	183A.	E. L. T. Taylor—Refund of amount paid on Certificate of Pur-		
Nil		chase No. 1706, Alberni, in name of James W. Westerman	200 00	
	183B.	John Svoboda—Refund of amount paid on Certificate of Pur-		
Nil		chase No. 2705, Nelson, in name of Frederick Adam	80 00	
	183C.	Captain E. R. Clutterbuck—Repurchase of Lot 164, Sayward		
Nil		District, Crown-granted in error, October 20th, 1910	8,881 40	
				44,161 40
		Carried forward		$ 241,388 02

Main Estimates and Special Warrants Fiscal Year 1920–21.	No. of Vote.	SERVICE.		Fiscal Year. 1920–21.
		Brought forward		$ 241,388 02
		DEPARTMENT OF LABOUR.		
$ 34,060 00	193.	Vancouver Employment Office:		
		Office supplies, etc.	$ 1,200 00	
		Remodelling, renovating, and equipment	6,293 40	
				7,493 40
		DEPARTMENT OF THE PROVINCIAL SECRETARY.		
212,196 00	213.	Mental Hospital, New Westminster—Maintenance	$ 20,000 00	
280,788 00	214.	Mental Hospital, Essondale—Maintenance	15,000 00	
88,152 00	215.	Colony Farm and Nursery, Essondale—Water-main	3,000 00	
46,480 00	216.	Mental Home, Colquitz—Maintenance	4,000 00	
235,247 48	224.	King's Printer—Printing-paper, etc.	12,000 00	
				54,000 00
		DEPARTMENT OF PUBLIC WORKS.		
67,774 00	244.	Administration—Office supplies, etc.	$ 600 00	
58,080 00	247.	District Engineers—Office supplies, etc.	600 00	
2,197,600 00	251.	Roads, Streets, Bridges, and Wharves—Maintenance and repairs	176,000 00	
	252.	Steamboats, Ferries, and Bridge-tenders—Subsidies and main-		
195,490 00		tenance	18,000 00	
Nil	252A.	Matsqui Drainage—Grant towards cost of works	60,000 00	
				255,200 00
		DEPARTMENT OF RAILWAYS.		
50,000 00	254.	Fraser River Bridge, New Westminster		4,000 00
		CAPITAL EXPENDITURE.		
5,000 00	273.	Warden's Residence, Oakalla Prison Farm		2,000 00
		Total		$ 564,081 42

1919-1920

SCHEDULE A

SUMS GRANTED TO HIS MAJESTY TO MAKE GOOD CERTAIN SUMS EXPENDED FOR THE PUBLIC SERVICE FOR THE PERIOD ENDED 31ST MARCH, 1920, AND TO INDEMNIFY THE SEVERAL OFFICERS AND PERSONS FOR MAKING SUCH EXPENDITURES.

SERVICE.	Amount.
DEPARTMENT OF AGRICULTURE:	
Prairie Markets Commissioner	$ 491 64
Farmers' Institutes, etc.	1,537 73
Women's Institutes, etc.	151 68
DEPARTMENT OF THE ATTORNEY-GENERAL:	
Land Registry Office, Nelson	375 44
Land Registry Office, New Westminster	299 23
Land Registry Office, Vancouver	381 91
Supreme and County Courts, Nelson	38 04
Provincial Police	14,633 41
Girls' Industrial School	616 82
Summoning and Paying Witnesses	1,063 27
Rewards	125 00
Motor-traffic Regulation	66 54
DEPARTMENT OF EDUCATION:	
Agricultural Education	5,248 68
Per Capita Grant to Cities	3,520 16
Per Capita Grant to Municipalities	13,676 90
Salaries of Teachers in Assisted Schools	1,075 15
DEPARTMENT OF FINANCE:	
Controlling and Audit Branch	234 61
Bureau of Information	509 67
Alberni Agency	1,807 14
Cumberland Agency	286 59
Duncan Agency	69 09
Fernie Agency	139 60
Fort Fraser Agency	28 19
Kamloops Agency	362 92
Kaslo Agency	550 00
Merritt Agency	292 24
Nanaimo Agency	478 10
Nelson Agency	35 27
New Westminster Agency	230 49
150-Mile House Agency	26 05
Prince Rupert Agency	314 22
Princeton Agency	144 08
Carried forward	$ 48,809 86

SERVICE.	Amount.
Brought forward	$ 48,809 86
DEPARTMENT OF FINANCE—*Continued.*	
Quesnel Agency	909 06
Queen Charlotte Islands Sub-agency	16 47
Revelstoke Agency	116 74
Rossland Agency	29 32
Telegraph Creek Agency	88 16
Vancouver Agency	12 39
Vernon Agency	1,256 94
Victoria Assessor	111 21
Wilmer Sub-agency	57 02
Sundry Sub-agencies	397 44
DEPARTMENT OF LANDS:	
Land Surveys	2,883 16
DEPARTMENT OF THE PROVINCIAL SECRETARY:	
Provincial Board of Health	1,708 25
Provincial Library Archives	757 56
Mental Hospital, New Westminster	1,258 85
Colony Farm and Nursery	11,715 31
Provincial Home, Kamloops	323 60
King's Printer	3,005 64
Registration of Voters	407 09
"Public Libraries Act, 1919"	8 21
DEPARTMENT OF PUBLIC WORKS:	
General Office	460 39
District Engineers	2,245 22
"Factories Act"	59 39
Roads, Streets, Bridges, and Wharves	46,568 78
DEPARTMENT OF RAILWAYS:	
General Office	169 42
Fraser River Bridge, New Westminster	4,363 02
CAPITAL ACCOUNT:	
Industrial School and Subnormal Boys' School	83 79
Total	$ 127,822 29

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER

1920

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, ETC.

IN THE

PROVINCE OF BRITISH COLUMBIA

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Provincial Mineralogist upon the Mining Industry of the Province for the year 1920 is herewith respectfully submitted.

WILLIAM SLOAN,

Minister of Mines.

Minister of Mines' Office,

March 16th, 1921.

Atlin Mountain as seen from Atlin across the Lake.

To the Honourable William Sloan,
Minister of Mines,

Sir,—I have the honour to submit herewith my Annual Report on the Mining Industry of the Province for the year ending December 31st, 1920.

The statistical tables give the total mineral output of the Province to date, and show in considerable detail the actual mineral production of the past year, as based on smelter or mill returns; also, a summary of the production of each of the last four years, thus illustrating by comparison the progress made in productive mining during this period.

To facilitate comparison with information previously given, I have retained, as closely as was possible, the general form already established for such tables and for the Report.

I have the honour to be,
Sir,
Your obedient servant,

WILLIAM FLEET ROBERTSON,
Provincial Mineralogist.

Bureau of Mines, Victoria, B.C.,
March 16th, 1921.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

METHOD OF COMPUTING PRODUCTION.

In assembling the output of the lode mines in the following tables, the established custom of this Bureau has been adhered to, viz.: The output of a mine for the year is considered that amount of ore for which the smelter or mill returns have been received during the year. This system does not give the exact amount mined during the year, but rather the amount credited to the mine on the company's books during such year.

For ore shipped in December the smelter returns are not likely to be received until February in the new year, or later, and have, consequently, to be carried over to the credit of such new year. This plan, however, will be found very approximate for each year, and ultimately correct, as ore not credited in one year is credited in the next.

In the lode mines tables, the amount of the shipments has been obtained from certified returns received from the various mines, as provided for in the "Inspection of Metalliferous Mines Act, 1897." In calculating the value of the products, the average prices for the year in the New York Metal Market have been used as a basis. For silver 95 per cent., for lead 90 per cent., and for zinc 85 per cent. of such market prices have been taken. Treatment and other charges have not been deducted, except that in copper the amount of metal actually recovered has been taken, thus covering loss in slags.

TABLE I.—TOTAL PRODUCTION FOR ALL YEARS UP TO AND INCLUDING 1920.

Gold, placer	$ 75,944,203
Gold, lode	102,753,823
Silver	53,668,284
Copper	161,513,864
Lead	46,637,221
Zinc	19,896,466
Coal and coke	212,573,492
Building-stone, bricks, etc.	32,168,217
Miscellaneous minerals, etc	1,037,408
Total	$706,192,978

TABLE II.—PRODUCTION FOR EACH YEAR FROM 1852 TO 1920 (INCLUSIVE).

1852 to 1892 (inclusive)	$ 81,090,069
1893	3,588,413
1894	4,225,717
1895	5,643,042
1896	7,507,956
1897	10,455,268
1898	10,906,861
1899	12,393,131
1900	16,344,751
1901	20,086,780
1902	17,486,550
1903	17,495,954
1904	18,977,359
1905	22,461,325
1906	24,980,546
1907	25,882,560
1908	23,851,277
1909	24,443,025
1910	26,377,066
1911	23,499,072
1912	32,440,800
1913	30,296,398
1914	26,388,825
1915	29,447,508
1916	42,290,462
1917	37,010,392
1918	41,782,474
1919	33,296,313
1920	35,543,084
Total	$706,192,978

Table III. gives a statement in detail of the quantities and value of the different mineral products for the years 1918, 1919, and 1920. It is difficult to get absolutely complete statistics regarding building-stone, lime, bricks, tiles, and other miscellaneous products, but the detail figures shown in Table V. are as nearly accurate as can be obtained.

TABLE III.

QUANTITIES AND VALUE OF MINERAL PRODUCTS FOR 1918, 1919, AND 1920.

	Customary Measure.	1918.		1919.		1920.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold placer	Ounces.	16,000	$ 320,000	14,325	$ 286,500	11,080	$ 221,600
" lode	"	164,674	3,403,812	152,426	3,150,645	120,048	2,481,392
Silver	"	3,498,172	3,215,870	3,403,119	3,592,673	3,377,849	3,235,980
Copper	Pounds	61,483,754	15,143,449	42,459,339	7,939,896	44,887,676	7,832,899
Lead	"	43,899,661	2,928,107	29,475,968	1,526,855	39,331,218	2,816,115
Zinc	"	41,772,916	2,899,040	56,737,651	3,540,429	47,208,268	3,077,979
Coal	Tons, 2,240 lb.	2,302,245	11,511,225	2,267,541	11,337,705	2,595,125	12,975,625
Coke	" "	188,967	1,322,769	91,138	637,966	67,792	474,544
Miscellaneous products			1,038,202		1,283,644		2,426,950
			$41,782,474		$33,296,313		$35,543,084

TABLE IV.

OUTPUT OF MINERAL PRODUCTS BY DISTRICTS AND DIVISIONS.

NAMES.	DIVISIONS.			DISTRICTS.		
	1918.	1919.	1920.	1918.	1919.	1920.
CARIBOO DISTRICT				$ 383,996	$ 196,801	$ 222,335
Cariboo and Quesnel Mining Division	$ 83,500	$ 73,500	$ 66,000			
Omineca Mining Division	300,496	123,301	156,335			
CASSIAR DISTRICT				9,178,441	6,402,082	7,293,008
EAST KOOTENAY DISTRICT				7,259,897	6,612,954	9,428,989
WEST KOOTENAY DISTRICT				6,113,279	4,669,090	3,049,731
Ainsworth Division	663,388	405,478	558,339			
Slocan and Slocan City "	3,675,762	2,900,087	1,390,563			
Nelson and Arrow Lake "	396,697	76,719	100,565			
Trail Creek "	1,357,571	1,275,538	982,020			
Revelstoke, Trout Lake, Lardeau	19,861	11,268	18,244			
BOUNDARY-YALE DISTRICT				4,961,452	2,527,514	2,011,803
Osoyoos, Grand Forks, and Greenwood Divisions	3,897,826	1,637,827	1,109,527			
Similkameen, Nicola, Vernon	909,869	759,637	842,287			
Yale, Ashcroft, Kamloops	153,757	130,050	59,989			
LILLOOET DISTRICT				57,746	62,684	15,980
COAST DISTRICT (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver)				13,827,663	12,825,188	13,521,238
				$41,782,474	$33,296,313	$35,543,084

TABLE V.

MISCELLANEOUS PRODUCTS AND TOTALS OF PRODUCTION, 1920.

District and Division.	Cement.	Lime and Limestone.	Building-stone.	Riprap.	Crushed Rock, Flux.	Sand and Gravel.	Pottery and Clay.	Fire, Face, and Red Brick.	Total Building Materials.	Miscellaneous Minerals.	Total Miscellaneous Products.	Total Output of Collieries.	Total Metalliferous Minerals.	Totals for Divisions.	Totals for Districts.
	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
CARIBOO															222,335
Cariboo and Quesnel													66,000	66,000	
Omineca												7,000	149,335	156,335	
CASSIAR															7,293,008
Atlin, Stikine, Liard													138,600	138,600	
Skeena, Nass River, Portland Canal, Queen Charlotte		48,000			150,000				198,000		198,000		6,956,408	7,154,408	
EAST KOOTENAY															9,428,989
Fort Steele										21,500	21,500	4,203,244	5,074,204	9,298,948	
Windermere, Golden													130,041	130,041	
WEST KOOTENAY															3,049,731
Ainsworth													558,339	558,339	
Slocan and Slocan City													1,390,563	1,390,563	
Nelson, Arrow Lake						1,900			1,900		1,900		98,665	100,565	
Trail Creek													982,020	982,020	
Revelstoke, Trout Lake, Lardeau						3,500			3,500		3,500		14,744	18,244	
BOUNDARY-YALE															2,011,803
Grand Forks Greenwood Osoyoos		15,636							15,636	193,702	209,338		900,189	1,109,527	
Similkameen Nicola Vernon Yale Ashcroft Kamloops								5,296	5,296	400	5,696	748,655	87,936	842,287	
								140	140	8,000	8,140		51,849	59,989	
LILLOOET-CLINTON															15,980
Lillooet and Clinton										10,000	10,000		5,980	15,980	
COAST-SOUTHERN															13,521,238
Vancouver Island (Nanaimo, Quatsino, Clayoquot, Alberni, Victoria)	822,484	274,515				44,516	9,823	92,101	1,243,439	15,488	1,258,927	8,491,270	22,839	9,773,036	
Mainland (Vancouver, New Westminster)				981	117,787	74,871	237,500	277,410	708,549	1,400	709,949		3,038,253	3,748,202	
Totals	822,484	338,151		981	267,787	124,787	247,323	374,947	2,176,460	250,490	2,426,950	13,450,169	19,665,965	35,543,084	35,543,084

TABLE VI.—PLACER GOLD.

Table VI. contains the yearly production of placer gold to date, as determined by the returns sent in by the banks and express companies, of gold transmitted by them to the mints, and from returns sent in by the Gold Commissioners and Mining Recorders. To these yearly amounts one-third was added up to the year 1878; from then to 1895 and from 1898 to 1909, one-fifth; and since then one-tenth, which proportions are considered to represent, approximately, the amount of gold sold of which there is no record. This placer gold contains from 10 to 25 per cent. silver, but the silver value has not been separated from the totals, as it would be insignificant.

YIELD OF PLACER GOLD TO DATE.

1858	$ 705,000	1874	$1,844,618	1890	$ 490,435	1906	$ 948,400
1859	1,615,070	1875	2,474,004	1891	429,811	1907	828,000
1860	2,228,543	1876	1,786,648	1892	399,526	1908	647,000
1861	2,666,118	1877	1,608,182	1893	356,131	1909	477,000
1862	2,656,903	1878	1,275,204	1894	405,516	1910	540,000
1863	3,913,563	1879	1,290,058	1895	481,683	1911	426,000
1864	3,735,850	1880	1,013,827	1896	544,026	1912	555,500
1865	3,491,205	1881	1,046,737	1897	513,520	1913	510,000
1866	2,662,106	1882	954,085	1898	643,346	1914	565,000
1867	2,480,868	1883	794,252	1899	1,344,900	1915	770,000
1868	3,372,972	1884	736,165	1900	1,278,724	1916	580,500
1869	1,774,978	1885	713,738	1901	970,100	1917	496,000
1870	1,336,956	1886	903,651	1902	1,073,140	1918	320,000
1871	1,799,440	1887	693,709	1903	1,060,420	1919	286,500
1872	1,610,972	1888	616,731	1904	1,115,300	1920	221,600
1873	1,305,749	1889	588,923	1905	969,300		
						Total	$75,944,203

TABLE VII.—PRODUCTION OF LODE MINES.

YEAR.	GOLD.		SILVER.		COPPER.		LEAD.		ZINC.		TOTAL VALUE.
	Oz.	Value.	Oz.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
		$		$		$		$		$	$
1887			17,690	17,331			204,800	9,216			26,547
1888			79,780	75,000			674,500	29,813			104,813
1889			53,192	47,873			165,100	6,498			54,371
1890			70,427	73,948			*Nil.*	*Nil.*			73,948
1891			4,500	4,000			*Nil.*	*Nil.*			4,000
1892			77,160	66,935			808,420	33,064			99,999
1893	1,170	23,404	227,000	195,000			2,135,023	78,996			297,400
1894	6,252	125,014	746,379	470,219	324,680	16,234	5,662,523	169,875			781,342
1895	39,264	785,271	1,496,522	977,229	952,840	47,642	16,475,464	532,255			2,342,397
1896	62,259	1,244,180	3,135,343	2,100,689	3,818,556	190,926	24,199,977	721,384			4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	5,325,180	266,258	38,841,135	1,390,517			7,052,431
1898	110,061	2,201,217	4,292,401	2,375,841	7,271,678	874,781	31,693,559	1,077,581			6,529,420
1899	138,315	2,857,573	2,939,413	1,663,708	7,722,591	1,351,453	21,862,436	878,870			6,751,604
1900	167,152	3,453,381	3,958,175	2,309,200	9,997,080	1,615,289	63,358,621	2,691,887			10,069,757
1901	210,384	4,348,603	5,151,333	2,884,745	27,603,746	4,446,963	51,582,906	2,002,733			13,683,044
1902	236,491	4,888,269	3,917,917	1,941,328	29,636,057	3,446,673	22,536,381	824,832			11,101,102
1903	232,831	4,812,616	2,996,204	1,521,472	34,359,921	4,547,535	18,089,283	689,744			11,571,367
1904	222,042	4,589,608	3,222,481	1,719,516	35,710,128	4,578,037	36,646,244	1,421,874			12,309,035
1905	238,660	4,933,102	3,439,417	1,971,818	37,692,251	5,876,222	56,580,703	2,399,022			15,180,164
1906	224,027	4,630,639	2,990,262	1,897,320	42,990,488	8,288,565	52,408,217	2,667,578			17,484,102
1907	196,179	4,055,020	2,745,448	1,703,825	40,832,720	8,166,544	47,738,703	2,291,458			16,216,847
1908	255,582	5,282,880	2,631,389	1,321,483	47,274,614	6,240,249	43,195,733	1,632,799			14,477,411
1909	238,224	4,924,090	2,532,742	1,239,270	45,597,245	5,918,522	44,396,346	1,709,259	8,500,000	400,000	14,191,141
1910	267,701	5,533,380	2,450,241	1,245,016	38,243,934	4,871,512	34,658,746	1,386,350	4,184,192	192,473	13,228,731
1911	228,617	4,725,513	1,892,364	958,293	36,927,656	4,571,644	26,872,397	1,069,521	2,634,544	129,092	11,454,063
1912	257,496	5,322,442	3,132,108	1,810,045	51,456,537	8,408,513	44,871,454	1,805,627	5,358,280	316,139	17,662,766
1913	272,254	5,627,490	3,465,856	1,968,606	46,460,305	7,094,489	55,364,677	2,175,832	6,758,768	324,421	17,190,838
1914	247,170	5,109,004	3,602,180	1,876,736	45,009,699	6,121,319	50,625,048	1,771,877	7,866,467	346,125	15,225,061
1915	250,021	5,167,934	3,366,506	1,588,991	56,918,405	9,835,500	46,503,590	1,939,200	12,982,440	1,460,524	19,992,149
1916	221,932	4,587,334	3,301,923	2,059,739	65,379,364	17,784,494	48,727,516	3,007,462	37,168,980	4,043,985	31,483,014
1917	114,523	2,367,190	2,929,216	2,265,749	59,007,565	16,038,256	37,307,465	2,951,020	41,848,513	3,166,259	26,788,474
1918	164,674	3,403,812	3,498,172	3,215,870	61,483,754	15,143,449	43,899,661	2,928,107	41,772,916	2,899,040	27,590,278
1919	152,426	3,150,645	3,403,119	3,592,673	42,459,339	7,939,896	29,475,968	1,526,855	56,737,651	3,540,429	19,750,498
1920	120,048	2,481,392	3,377,849	3,235,980	44,887,676	7,832,899	39,331,218	2,816,115	47,208,268	3,077,979	19,444,365
Total	4,981,888	102,753,823	86,617,680	53,668,284	925,344,009	161,513,864	1,036,893,814	46,637,221	273,021,019	19,896,466	384,469,658

TABLE VIII.—COAL AND COKE PRODUCTION PER YEAR TO DATE.

COAL.

Year.	Tons (2,240 lb.).	Value.
1836-1881	1,873,907	$ 6,003,245
1882	282,139	846,417
1883	213,299	639,897
1884	394,070	1,182,210
1885	265,596	796,788
1886	326,636	979,908
1887	413,360	1,240,080
1888	489,301	1,467,903
1889	579,830	1,739,490
1890	678,140	2,034,420
1891	1,029,097	3,087,291
1892	826,335	2,479,005
1893	978,294	2,934,882
1894	1,012,953	3,038,859
1895	939,654	2,818,962
1896	896,222	2,688,666
1897	882,854	2,648,562
1898	1,135,865	3,407,595
1899	1,306,324	3,918,972
1900	1,439,595	4,318,785
1901	1,460,331	4,380,993
1902	1,397,394	4,192,182
1903	1,168,194	3,504,582
1904	1,253,628	3,760,884
1905	1,384,312	4,152,936
1906	1,517,303	4,551,909
1907	1,800,067	6,300,235
1908	1,677,849	5,872,472
1909	2,006,476	7,022,666
1910	2,800,046	9,800,161
1911	2,193,062	7,675,717
1912	2,628,804	9,200,814
1913	2,137,483	7,481,190
1914	1,810,967	6,338,385
1915	1,611,129	5,638,952
1916	2,084,093	7,294,325
1917	2,149,975	7,524,913
1918	2,302,245	11,511,225
1919	2,267,541	11,337,705
1920	2,595,125	12,975,625
Total	54,209,495	$188,789,808

COKE.

Year.	Tons (2,240 lb.).	Value.
1895-97	19,396	$ 96,980
1898 (estimated)	35,000	175,000
1899	34,251	171,255
1900	85,149	425,745
1901	127,081	635,405
1902	128,015	640,075
1903	165,543	827,715
1904	238,428	1,192,140
1905	271,785	1,358,925
1906	199,227	996,135
1907	222,913	1,337,478
1908	247,399	1,484,394
1909	258,703	1,552,218
1910	218,029	1,308,174
1911	66,005	396,030
1912	264.333	1,585,998
1913	286,045	1,716,270
1914	234,577	1,407,462
1915	245,871	1,475,226
1916	267,725	1,606,350
1917	159,905	959,430
1918	188,967	1,322,769
1919	91,138	637,966
1920	67,792	474,544
Total	4,123,267	$23,783,684

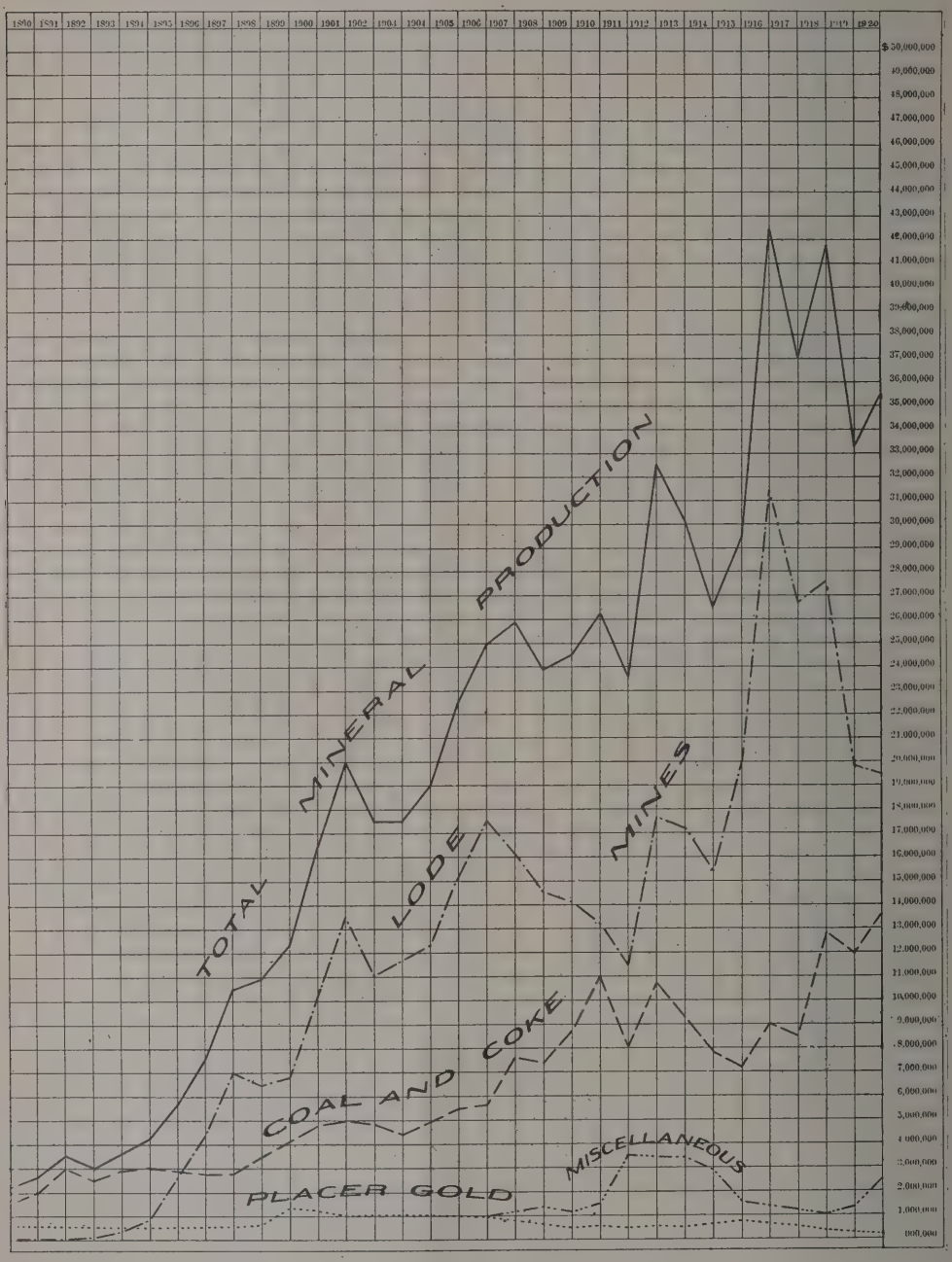
TABLE IX.—PRODUCTION IN DETAIL OF THE

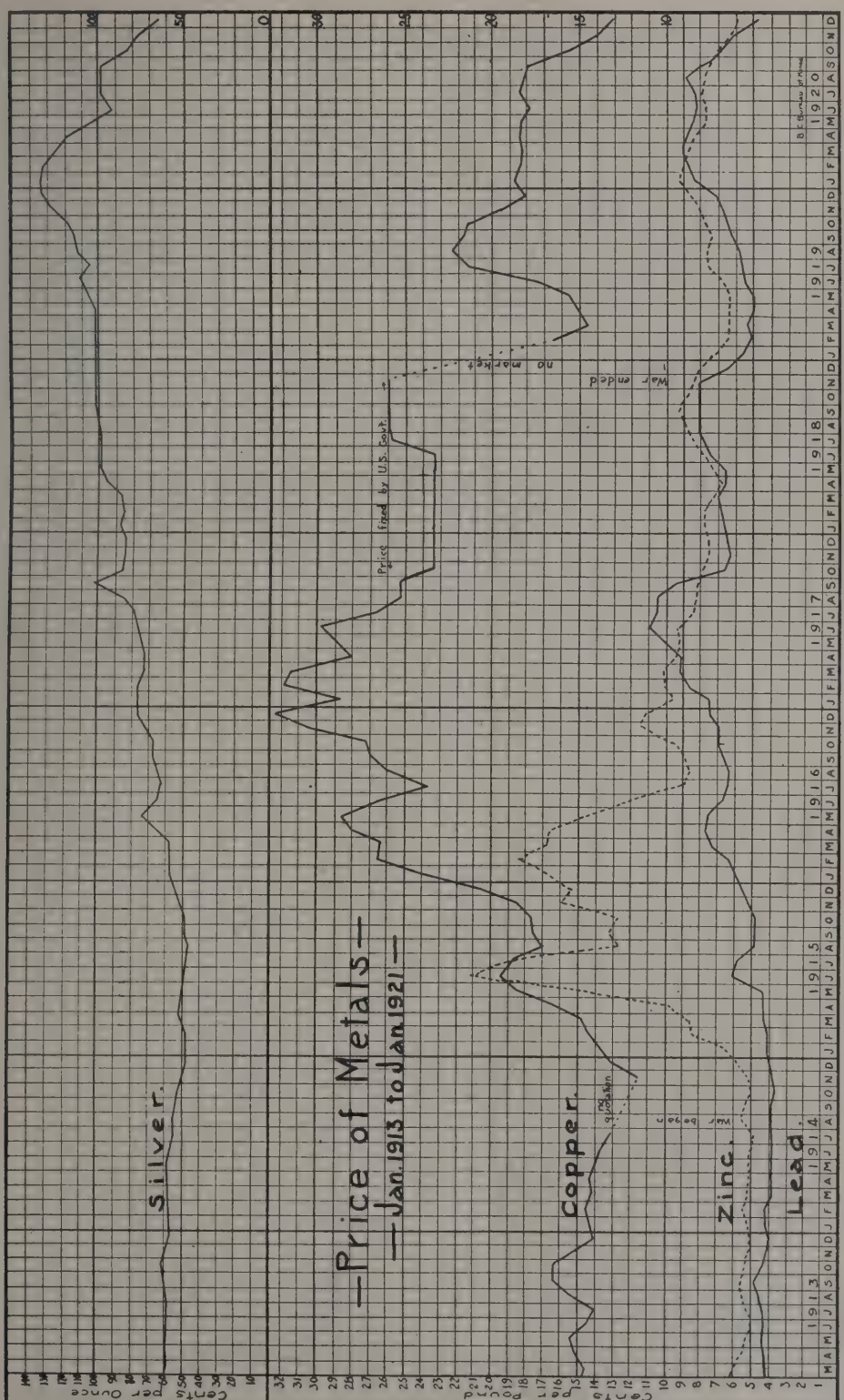
DISTRICT.	YEAR	TONS.	GOLD—PLACER.		GOLD—LODE.		SILVER.	
			Ounces	Value.	Ounces.	Value.	Ounces.	Value.
				$		$		$
Cariboo								
Cariboo and Quesnel Divisions	1917		7,500	150,000				
	1918		4,000	80,000				
	1919		3,500	70,000				
	1920		3,300	66,000				
Omineca Division	1917	4,159	600	12,000	931	19,244	82,311	63,668
	1918	6,956	400	8,000	985	20,360	84,125	77,336
	1919	4,051	400	8,000	147	3,038	72,573	76,615
	1920	4,000	150	3,000	218	4,506	103,020	98,693
Cassiar								
Atlin, Stikine, and Liard Divisions	1917	33	15,600	312,000	1,000	20,670		
	1918	73	11,025	220,500	446	9,219	1,115	1,025
	1919		8,850	177,000				
	1920		6,930	138,600				
Skeena, Nass, Portland Canal, and Queen Charlotte Divisions	1917	821,819			9,805	202,669	343,805	265,933
	1918	956,231			48,016	992,491	416,616	382,995
	1919	760,057	850	17,000	60,076	1,241,771	920,413	971,680
	1920	944,208	150	3,000	54,531	1,127,156	1,317,832	1,262,483
East Kootenay								
Fort Steele Division	1917	114,391	100	2,000			180,168	139,380
	1918	137,950	50	1,000			261,497	240,394
	1919	145,039	50	1,000			205,500	216,946
	1920	267,381	175	3,500			362,143	346,933
Windermere-Golden	1917	2,354					79,685	61,636
	1918	3,620					91,784	84,377
	1919	2,697			2	41	68,634	72,457
	1920	1,977					53,510	51,263
West Kootenay								
Ainsworth Division	1917	82,481			1	20	224,461	173,621
	1918	44,937			18	372	228,699	210,243
	1919	30,157			26	537	167,453	176,780
	1920	18,213			32	661	266,963	255,751
Slocan and Slocan City	1917	149,895			18	372	1,547,576	1,197,050
	1918	142,700			67	1,385	1,873,236	1,722,066
	1919	139,824			95	1,964	1,556,714	1,643,423
	1920	59,768			73	1,509	738,515	707,497
Nelson and Arrow Lake Divisions	1917	10,738	50	1,000	2,521	52,109	46,229	35,758
	1918	15,348	50	1,000	7,155	147,894	136,738	125,703
	1919	5,694	25	500	297	6,139	44,280	46,747
	1920	6,189	25	500	1,924	39,769	7,065	6,768
Trail Creek Division	1917	100,171			33,290	688,104	47,112	36,441
	1918	112,349			43,745	904,209	47,203	43,394
	1919	88,266			50,229	1,038,233	27,788	29,336
	1920	67,714			36,425	752,905	36,411	34,882
Revelstoke, Trout Lake, and Lardeau	1917	534	50	1,000	62	1,282	37,733	29,187
	1918	255	50	1,000	35	723	11,761	10,812
	1919	47	50	1,000	8	165	2,994	3,161
	1920	91	50	1,000	7	145	7,979	7,644
Boundary-Yale								
Grand Forks, Greenwood, and Osoyoos Divisions.	1917	779,345	50	1,000	58,544	1,210,104	220,213	170,335
	1918	692,504	50	1,000	55,353	1,144,147	227,113	208,785
	1919	252,106	50	1,000	32,874	679,506	222,680	235,083
	1920	84,125	25	500	20,366	420,965	385,681	369,482
Similkameen, Nicola, and Vernon Divisions	1917	1,384	400	8,000	111	2,294	3,470	2,684
	1918	73	250	5,000	1	21	131	120
	1919	154	50	1,000	25	517	6,823	7,203
	1920	18,996	25	500	83	1,716	4,876	4,671
Yale, Ashcroft, and Kamloops Divisions	1917	8,254	100	2,000	1,355	28,008	3,525	2,727
	1918	30,826	50	1,000	815	16,846	1,317	1,211
	1919	29,871	100	2,000	627	12,960	2,096	2,213
	1920	1,025	50	1,000	238	4,919	437	419
Lillooet								
Lillooet and Clinton Divisions	1917	4,700	300	6,000	3,092	63,912	276	213
	1918	3,858	50	1,000	2,473	51,117	412	379
	1919	4,720	375	7,500	2,506	51,799	365	385
	1920	200	175	3,500	120	2,480		
Southern Coast								
Vancouver Island (Nanaimo, Alberni, Clayoquot, Quatsino, and Victoria Divisions)	1917	19,221	50	1,000	2,813	58,145	25,727	19,900
	1918	13,269	25	500	2,515	51,985	23,040	21,181
	1919	7,657	25	500	1,164	24,060	9,936	10,490
	1920	6,183	25	500	19	393	2,745	2,630
Mainland (Vancouver and New Westminster Divisions)	1917	662,100			980	20,257	86,925	67,236
	1918	731,900			3,050	63,043	93,385	85,849
	1919	642,635			4,350	89,915	94,870	100,154
	1920	698,117			6,012	124,268	80,672	86,864
TOTALS	1917	2,761,579	24,800	496,000	114,523	2,367,190	2,929,216	2,265,749
	1918	2,892,849	16,000	320,000	164,674	3,403,812	3,498,172	3,215,870
	1919	2,112,975	14,325	286,500	152,426	3,150,645	3,403,119	3,592,673
	1920	2,178,187	11,080	221,600	120,043	2,481,392	3,377,849	3,235,980

Metalliferous Mines, etc., for 1917, 1918, 1919, and 1920.

Copper.		Lead.		Zinc.		Totals for Divisions.				Totals for Districts.
Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	1917.	1918.	1919.	1920.	1920.
	$		$		$	$	$	$	$	$
										215,335
						150,000				
							80,000			
								70,000		
									66,000	
852,373	231,675	271,885	21,506	364,097	27,548	375,641				
643,843	158,578	123,568	8,242	313,112	21,730		294,246			
16,205	3,030	180,455	9,347	224,539	14,011			114,041		
		189,488	13,567	453,512	29,569				149,335	
										7,095,008
						332,670				
11,160	2,749						233,493			
								177,000		
									138,600	
27,978,015	7,604,424					8,073,026				
30,190,606	7,435,946						8,811,432			
20,411,421	3,816,936							6,047,387		
26,153,406	4,563,769								6,956,408	
										5,204,245
9,679	2,631	13,996,640	1,107,134	20,715,090	1,567,304	2,818,429				
1,768	435	18,695,565	1,246,994	26,704,806	1,853,313		3,342,136			
		10,729,483	555,787	46,460,703	2,899,148			3,672,881		
		26,926,319	1,527,924	42,881,092	2,795,847				5,074,204	
12,640	3,436	1,774,649	140,375	18,000	1,362	206,809				
		2,659,210	177,369				261,746			
		1,659,279	85,951					158,449		
1,953	341	1,095,486	78,437						130,041	
										3,044,331
		6,395,350	505,872	918,601	69,501	749,014				
		6,106,262	407,288	640,991	44,485		662,388			
		4,336,602	224,636	36,785	2,295			404,248		
		4,072,807	291,613	158,193	10,314				558,339	
		11,808,019	934,014	18,789,573	1,421,619	3,553,055				
242	60	14,575,379	972,178	14,107,682	979,073		3,674,762			
		12,156,845	629,725	10,015,624	624,975			2,900,087		
		6,135,581	439,308	3,715,471	242,249				1,390,563	
50,946	13,847	2,605,666	206,108	982,309	74,322	383,144				
28,933	7,126	1,611,166	107,465				389,188			
21,964	4,107	292,010	15,126					72,619		
755	132	719,219	51,496						98,665	
1,730,088	470,238					1,194,783				
1,654,356	407,468						1,355,071			
1,112,133	207,969							1,275,538		
1,113,085	194,233								982,020	
		395,321	31,270	33,279	2,518	65,257				
		80,773	5,387	6,325	439		18,361			
		44,035	2,281					6,607		
		83,165	5,955						14,744	
										1,039,974
10,329,765	2,807,630	36,548	2,891			4,191,960				
9,940,125	2,448,253	47,738	3,184				3,805,369			
3,273,655	612,173	43,200	2,238					1,530,000		
582,360	101,622	106,433	7,620						900,189	
87,326	23,735	10,697	846			37,559				
11,928	2,938						8,079			
5,180	969	4,594	238					9,927		
463,347	80,854	2,720	195						87,936	
700,199	190,314	12,690	1,004	27,564	2,085	226,138				
525,780	129,500						148,557			
556,681	104,099	29,465	1,526					122,798		
260,808	45,511								51,849	
										5,980
						70,125				
							52,496			
								59,684		
									5,980	
										3,031,092
1,461,704	397,291					476,336				
926,886	228,292						301,958			
432,252	80,831							115,881		
110,696	19,316								22,839	
15,794,830	4,293,035					4,380,528				
17,548,127	4,322,104						4,470,996			
16,629,848	3,109,782							3,299,851		
16,201,266	2,827,121								3,038,253	
59,007,565	16,038,256	37,307,465	2,951,020	41,848,513	3,166,259	27,284,474				
61,483,754	15,143,449	43,899,661	2,928,107	41,772,916	2,899,040		27,910,278			
42,459,339	7,939,896	29,475,968	1,526,855	56,737,651	3,540,429			20,036,998		
44,887,676	7,832,899	39,331,218	2,816,115	47,208,268	3,077,979				19,665,965	19,665,965

TABLE X.—SHOWING MINERAL PRODUCTION OF BRITISH COLUMBIA.




Price of Metals
Jan. 1913 to Jan. 1921
Silver.
Copper.
Zinc.
Lead.
Cents per Ounce
Cents per Pound
Price fixed by U.S. Govt.
no market
War ended
1913
1914
1915
1916
1917
1918
1919
1920

PROGRESS OF MINING.

The gross value of the mineral production of the Province for the year 1920 was $35,543,084, an increase over that of the preceding year of $2,246,771, or equivalent to an increase of about 7 per cent.

It is extremely gratifying that British Columbia's mining industry has been so well maintained, notwithstanding the fluctuating metal market, and despite generally unsettled conditions, that it is possible to report an increase in 1920 over the value of the production of 1919.

It is to be remembered, too, that other mineral-producing sections of America have of late been announcing reductions in mineral-output, a fact which emphasizes the very satisfactory showing of this Province.

The gold production of the Province for the year 1920 amounted in value to $2,702,992, a decrease from the preceding year of $734,153. This might have been expected, as the mining of gold, with its fixed value, has in these times of high cost of labour and supplies for some years past offered little encouragement, and even less at the beginning of this year, on the eve of what promised to be a period of unstable prices. With what is now an assured promise of lower costs of supplies and living, it would seem that gold-mining would again become profitable, and we may confidently look for an increased gold production in the near future.

With the other metals during the past couple of years it has been a battle of prices, of wild fluctuations in the market values of the metals, causing an uncertain market demand for ores, for smelters could not buy ores in the face of an impending drop in the market values of the contained metals and the subsequent loss.

To indicate how fluctuating the market has been, a chart has been prepared to accompany this Report, which shows the monthly fluctuations of metal-market prices from 1913 to date.

It is quite apparent, from the chart, that there has been a great drop from war-days in all metal prices, but, for all this, it is to be noted that the market prices even at the end of the year are not lower than the normal pre-war prices, at which profitable mining was carried on.

By the end of the year productive copper-mining all over the American continent had been greatly curtailed, with many mines closed down entirely. This state of stagnation in the copper-mining industry will prevail until the prices of the elements entering into and making up the costs of mining and treatment of ores are reduced, or when the market prices of the metals are raised, and with some assurance of continuance at such higher level.

As to the first of these alternatives, there seems to be a tendency to a material reduction in price of the essential factors making up the mining costs, which will eventually so reduce the cost of mining as to permit of operations being again profitably carried on.

As to the second alternative, a rise in metal prices, until these meet the cost of production, this is bound to come eventually when the world's markets again approach normal conditions, and when that will be depends upon how soon the world—particularly Europe, where our great market lies—settles down to pre-war industry and is able to buy our products.

These conditions apply particularly to the larger and lower-grade mines, necessarily working on narrower margins per ton, rather than to the high-grade ores produced in smaller quantities and with wider margins between costs of production and selling-prices.

It will be noted that during the year 1920 the prices of all the metals were held up to a fair and uniform price during the first nine months of the year, and then, about the end of August, all metal prices simultaneously dropped about 40 per cent. to the present prices, which are unreasonably low and below the cost of production.

This sudden collapse of prices was not due to any condition of mining or of the metal market, but was the reflex action of industrial conditions the world over, entirely apart from the mining industry.

It is reassuring to find, in the face of all these untoward conditions, that nevertheless the metalliferous mines of the Province, as a whole, still made a production valued at $19,665,965, as compared with a production in 1919 of $20,036,998—a nominal decrease of only $371,033, equivalent to less than 2 per cent.

The fluctuations of the market, already referred to, have caused some strange anomalies, as shown in the accompanying table of production; for instance, the quantity of copper

produced in 1920 is greater than was produced in 1919, but the average yearly price of the metal was so much lower in 1920 that the value of the product of the metal is less than in 1919.

The production of zinc under the existing conditions was unexpectedly large and is entirely due to the increased operations of the Consolidated Mining and Smelting Company at the company's *Sullivan* mine in East Kootenay.

During the last half of the year, in other places there has been little or no market for zinc ore, and a very small volume of sales of the metal; several of the larger zinc mines and refineries in the United States closed down early in the fall.

The collieries of the Province have more than held their own this year, having made a net coal production of 2,595,125 tons, valued at $12,975,625, and 67,792 tons of coke, valued at $474,544. The total value of the colliery products for the year was $13,450,169.

The net coal production for 1920 exceeds that of the previous year by 327,584 tons, and, as a matter of fact, it has only twice been equalled in quantity—i.e., in the years 1910 and 1912, when it was but slightly greater.

The old adage that "It's an ill wind that blows nobody good" is illustrated by the falling-off of the California oil-supply, thus causing a greatly increased demand for coal, particularly from the Coast collieries.

There was no coke made by the Coast collieries this past year; the Crowsnest Pass Colliery produced 67,792 tons, an increase over its last year's output.

The following table shows the number of mines which shipped ore during the year 1920, the districts in which they are situated, and the tonnage produced in each district, together with the number of men employed, both above ground and underground.

In explanation of the table it should be said that, in its preparation, a mine employing twelve men for four months is credited in the table with four men for twelve months, so that the total given is less than the actual number of individuals who worked in the mines during the year.

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1920.

	Tons of Ore shipped.	No. of Mines shipping.	No. of Mines shipping over 100 Tons in 1920.	Men employed in these Mines.		
				Below.	Above.	Total.
CARIBOO DISTRICT:						
Omineca	4,000	1	1	12	20	32
CASSIAR DISTRICT:						
Atlin, Stikine	...	..	...	...	...	...
Queen Charlotte, Portland Canal, Skeena, and Nass River	944,208	10	7	447	358	805
EAST KOOTENAY DISTRICT:						
Fort Steele	267,381	3	3	209	129	338
Windermere-Golden	1,977	6	3	35	15	50
WEST KOOTENAY DISTRICT:						
Ainsworth	18,213	20	11	100	55	155
Slocan and Slocan City	59,768	32	12	252	142	394
Nelson and Arrow Lake	6,189	6	4	49	40	89
Trail Creek	67,714	5	4	156	79	235
Revelstoke, Lardeau, and Trout Lake	91	3	..	10	5	15
BOUNDARY-YALE DISTRICT:						
Greenwood, Grand Forks, and Osoyoos	84,125	24	8	187	155	342
Similkameen, Nicola, and Vernon	18,996	2	1	101	107	208
Yale, Ashcroft, and Kamloops	1,025	3	1	18	17	35
LILLOOET DISTRICT	200	1	1	...	...	...
SOUTHERN COAST DISTRICT, V.I.	6,183	3	2	17	46	63
SOUTHERN COAST, MAINLAND	698,117	2	2	328	262	590
Total	2,178,187	121	60	1,921	1,430	3,351

In the following table of the non-shipping mines the returns are necessarily incomplete, as they include only the mines reporting to the Department, and not the prospects and properties under preliminary development, which in the aggregate give employment to a large number of men.

TABLE SHOWING NON-SHIPPING MINES AND MEN EMPLOYED.

District.	Number of Mines.			Men employed.		
	Working.	Idle.	Total.	Below.	Above.	Total.
Cariboo and Cassiar	15	19	34	37	35	72
East Kootenay	5	10	15	10	15	25
Ainsworth	6	21	27	9	5	14
Slocan	14	30	44	28	12	40
Nelson	5	21	26	7	13	20
Trail Creek	1	7	8	..	1	1
Revelstoke-Lardeau	8	8	16	12	10	22
Boundary-Yale	9	41	50	9	37	46
Lillooet	3	5	8	4	3	7
Southern Coast	6	17	23	37	44	81
Total	72	179	251	153	175	328

SUMMARY OF STATISTICAL TABLES.

Referring to the preceding tables of the mineral production of the Province, the following is a summary of their contents:—

TABLE I. shows the total gross value of each mineral product mined in the Province up to the end of 1920, aggregating $706,192,978. From this table it will be seen that coal-mining has produced more than any other separate class of mining, a total of $212,573,492; followed next in importance by copper at $161,513,864, and next in order is lode gold at $102,753,823, with placer gold in fourth place at $75,944,203.

TABLE II. shows the value of the total production of the mines of the Province from 1852 to 1892 (inclusive) and for each year from 1893 to 1920 (inclusive), during which period the output increased tenfold, and reached a gross production for the year 1920 of $35,543,084.

The value of the total mineral production of the Province up to the end of 1920 was $706,192,978.

TABLE III. gives the quantities in the customary units of measure, and the values, of the various metals or minerals which go to make up the total of the mineral production of the Province, and also, for the purpose of comparison, similar data for the two preceding years.

The table shows that there has been this year a decrease in the production of placer gold of $64,900 and a decrease in output of lode gold of $669,253, making a total decrease of $734,153 in the total production of the precious metal.

The amount of silver produced this past year was 3,377,849 oz., having a gross value of $3,235,980, a decrease in the number of ounces produced of 25,270.

The table shows an output of lead amounting to 39,331,218 lb., valued at $2,816,115, an increase in quantity of 9,855,250 lb. and in value of $1,289,260.

The production of copper this year was 44,887,676 lb., valued at $7,832,899, an increase in amount of 2,428,337 lb., or about 5 per cent. The value of the product was less than that of the preceding year by $106,997, due to lower prices.

The other metals are specifically mentioned under the headings which follow this summary.

TABLE IV. shows the proportions of the total mineral productions made in each of the various districts into which the Province is divided.

It will be noted that this year the Southern Coast District has again the honour of first place on the list, followed, in order of importance, by the East Kootenay, Cassiar, West Kootenay, and Boundary Districts. The Southern Coast and East Kootenay Districts owe a considerable proportion of their output to the coal-mines situated within their limits, whereas, in the other districts, the production is chiefly from metal-mining.

The Southern Coast District also derives a fair proportion of its production from "Miscellaneous products," such as building materials, etc., due to the larger cities therein; this year this amounted to $1,968,876, as shown in Table V.

TABLE V. is an endeavour to show in some detail the production of those products, such as building materials, previously summarized under "Miscellaneous products," and which amounts this year to $2,426,950. Much difficulty has been found in obtaining reliable figures regarding these products, and in many cases they have had to be estimated; but, while the figures are not as complete as desired, they are at least approximate, and show what an important branch of mineral production this has become, despite the falling-off due to the war and depressed financial conditions.

TABLE VI. shows the statistical record of the placer mines of the Province from 1858 to 1920, and shows a total production of $75,944,203. The output for 1920 was $221,600, a decrease, as compared with the previous year, of $64,900.

TABLE VII. relates entirely to the lode mines of the Province, and shows the quantities and values of the various metals produced each year since the beginning, in 1887, of such mining in the Province. The gross value of the product of these mines to date is $384,469,658; this figure includes the zinc production of 1909 and all subsequent years.

TABLE VIII. contains the statistics of production of the coal-mines of the Province. The total net amount of coal produced to the end of 1920 was 54,209,495 tons (2,240 lb.), worth $188,789,808. Of this, there was produced in 1920 2,595,125 tons valued at $12,975,625. In these figures of coal production the coal used in making coke is not included, as such coal is accounted for in the figures of output of coke. The amount of coal used in making coke in 1920 was 101,649 tons, from which was made 67,792 tons of coke, having a value of $474,544, a decrease in amount from the preceding year of 23,346 tons. The total value of the output of the collieries of the Province in 1920 was $13,450,169.

More detailed statistics as to the coal production of the Province and of the separate districts are given elsewhere in this Report.

TABLE IX. gives the details of production of metalliferous mines of the Province for the years 1917, 1918, 1919, and 1920, and the districts in which such productions were made, showing the tonnage of ore mined in each district, with its metallic contents and its market value.

The total tonnage of ore mined in the Province during the year 1920 was 2,178,187 tons, having a gross value of $19,444,365, and, with the placer gold, a total value of $19,665,965.

The following table shows the tonnage derived from the various districts of the Province:—

Cassiar and Omineca District	948,208
Southern Coast District	704,300
Boundary-Yale District	104,146
Slocan Mining Division	59,768
East Kootenay District	269,358
Trail Creek Mining Division	67,714
Ainsworth Mining Division	18,213
Nelson Mining Division	6,189
Other Mining Divisions	291
Total	2,178,187

In reports previous to 1910 there has been included in Table IX. the "Miscellaneous products," and in 1910 these were shown distributed to the various districts; the great increase of these products in the past few years has rendered it advisable that this table be reserved exclusively for metalliferous products, and so a new table (No. V.) was introduced in 1911, giving in some detail the output of these miscellaneous products.

In making comparisons of this table with similar tables in previous reports, the fact that "Miscellaneous" has been removed will have to be borne in mind.

TABLE X. presents in graphic form the facts shown in figures in the tables, and demonstrates to the eye the rapid growth of lode-mining in the Province, and also the fluctuations to which it has been subject.

It will be seen that, although coal-mining has been a constantly increasing industry during this whole period of thirty years, lode-mining did not begin, practically, until 1894, since when it has risen with remarkable rapidity, though not without interruption, until it reached

its maximum in 1916, the $31,500,000 line. The total mineral production in 1910 reached the $26,000,000 line, in 1912 it reached the $32,000,000 line, in 1916 the $42,000,000 line, while this year it is just a little above the $35,500,000 line.

GOLD.

Placer Gold.

The recovery of placer gold for 1920 was $221,600, of which practically all was obtained in the Cariboo and Cassiar Districts, only about one-twentieth of the total coming from the other districts. An approximate apportionment is as follows: From Cariboo District, $69,000; Atlin, Stikine, and Liard Divisions of Cassiar District, $138,000; remaining parts of the Province, $14,600. This production for 1920 shows a decrease from the preceding year of $64,900, or about 23 per cent.

During the last four years the production of placer gold in the Province has steadily decreased. The chief reason is to be found in the economic conditions of high prices for labour and supplies, which made placer-mining less profitable than in former years. Shortage of labour also handicapped operations.

Information available regarding the Atlin Division shows that the production was considerably less than in 1919, and that some of the former operating companies were closed down during the year.

Gold from Lode-mining.

The value of lode gold produced in 1920 was $2,481,392, as compared with $3,150,645 in 1919, a decrease of $669,253, or about 21 per cent. During the year 1919 the Granby Company closed its mines and smelter in the Boundary-Yale District and therefore only made a clean-up production during the past year. The low-grade copper ore handled carries small gold and silver values, and in former years this gold production amounted to a considerable total. The *Nickel Plate* mine in this district also made a decreased production, the mine being closed down since September, 1920.

The Rossland mines, which prior to 1917 contributed annually about one-half of the output of lode gold, made a decreased production in 1920 as compared to the preceding year; during these two years about one-quarter the normal output was made.

The following table shows the gold production of 1919 and 1920:—

	1919. Oz.	1920. Oz.
Cassiar District	60,076	54,531
Rossland (Trail Creek)	50,229	36,425
Boundary-Yale	33,526	20,687
Coast (Southern)	5,514	6,031
Lillooet	2,506	120
Nelson	297	1,924
All others	278	330
Totals	152,426	120,048

From the above table it will be seen that the only districts to show an increase are the Nelson and Southern Coast Districts. In the latter case the increase is small. The output in Cassiar is mainly from the *Surf Inlet* mine, and the new shippers—namely, the *Premier* in the Salmon River section and the *Dolly Varden* mine in the Alice Arm section. The outlook for the future in this latter district is most promising and a largely increased production of gold and other metals may be expected.

The increase in Nelson Division is large and is mainly due to the *Nugget* mine being again operated. Developments in this district at present under way may bring the production up again to that of former years.

The production of gold in British Columbia during each of the last four years has only been about one-half of the annual output immediately preceding the war, and shows that gold-mining in this Province has, as elsewhere in the world, been adversely affected by the conditions of high costs and a standard price for the product. Nevertheless, from the developments now in progress it would seem that in a short time the annual production of gold in British Columbia should increase considerably.

SILVER.

The quantity of silver produced was 3,377,849 oz., worth $3,235,980, a decrease from the production of 1919 in quantity of 25,270 oz., and a decrease in value of $356,693, or nearly 10 per cent.

The market price of silver gradually but steadily fell during the whole year of 1920; the average price for the month of January was 132.83 cents an ounce, while for the month of December the price was about 65.8 cents an ounce, with a falling market. The average price for the year was 100.9 cents an ounce.

An accompanying diagram illustrates the fluctuations of market prices.

The following table shows the silver production for 1919 and 1920:—

	1919. Oz.	1920. Oz.
Slocan and Slocan City	1,556,714	738,515
Skeena	920,413	1,317,832
Boundary-Yale	231,599	390,994
Fort Steele	205,500	362,143
Ainsworth	167,453	266,963
Coast (Southern)	104,806	93,417
Omineca	72,573	103,020
Windermere-Golden	68,634	53,510
Nelson	44,280	7,065
All others	31,147	44,390
Totals	3,403,119	3,377,849

The above table shows an increase in the silver production from the Omineca, Skeena, Fort Steele, Boundary-Yale, and Ainsworth Districts, with decreases in all the others.

The greatest increase was made in the Skeena District and is accounted for by new shippers entering the lists. Two of these, the *Premier* and the *Dolly Varden* mines, give promise of swelling the silver production very materially during future years.

The greatest decrease is found in the Slocan District, where mining has been greatly retarded due to labour troubles with the O.B.U., and has nothing to do with the mines proper.

It is a pleasing surprise to find a very considerable increase in the Boundary-Yale District, despite the cutting-off of the production of the Granby and Canada Copper Corporation, which formerly produced 50 per cent. of the silver of the district.

The silver-output of this district this year is chiefly derived from the *Providence*, *Horn Silver*, *Sally*, and *Bell* mines.

COPPER.

The amount of copper produced in 1920 shows, as compared with the previous year, an increase in quantity, but owing to the lower market selling-price, a small decrease in value. The production was 44,887,676 lb., which is 2,428,337 lb. greater than the 1919 output; the value for this year is $7,832,899, which, compared with $7,939,896 made in 1919, shows a decrease of $106,997.

The demoralized condition of the copper market during 1919 was referred to somewhat fully in the report for that year, so that it is not necessary to further discuss it here.

The following table shows the production of copper, according to districts, in 1919 and in 1920:—

	1919. Lb.	1920. Lb.
Skeena	20,411,421	26,153,406
Coast (Southern)	17,062,100	16,311,962
Boundary-Yale	3,835,516	1,306,515
Trail Creek Division	1,112,133	1,113,085
All others	38,169	2,708
Totals	42,459,339	44,887,676

From the above table it will be seen that there has been a large increase in the Skeena and a small increase in the Trail Creek Division. In the Coast (Southern) District the main producer was the *Britannia*, and this property mined and milled a larger tonnage in 1920 than in any previous year. Considering the adverse market conditions, this increased production of the Britannia mine shows the satisfactory condition of the property.

In June, 1919, the Granby Company was forced to close down the low-grade mines at Phoenix and smelter at Grand Forks, resulting in a great decrease in the copper production of Boundary-Yale District.

The Granby Company made an increased production at the mines and smelter at Anyox, with the result that the copper production was greater than that of last year.

The *Marble Bay* mine at Vananda was not operated during the year.

The *Rocher Déboulé* mine, in Omineca Division, was closed all year, with the result that practically no copper was produced in that district.

LEAD.

The total amount of lead produced in 1920 was 39,331,218 lb., valued at $2,816,115. This represents, as compared with the previous year, an increase in quantity of 9,855,250 lb. and an increase in value of $1,289,260, or about 84 per cent.

Lead is the only one of the metals the market price of which was greater than in 1919, the average price for the year 1920 being 7.957 cents a pound.

Immediately after the Armistice and during early part of 1919 the price of lead in New York fell to 5 cents, but by the end of the year had gradually risen to 8 cents, and remained at about that price until September, 1920, when, in company with all the other metal prices, it fell rapidly, and at end of the year had reached the pre-war standard of about 4 cents.

The following table shows the production of lead, according to district, for the years 1919 and 1920:—

	1919. Lb.	1920. Lb.
Fort Steele	10,729,483	26,926,319
Slocan	12,156,845	6,135,581
Ainsworth	4,336,602	4,072,807
Windermere-Golden	1,659,279	1,095,486
Nelson	292,010	719,219
All others	301,749	381,806
Totals	29,475,968	39,331,218

From the above table it will be seen that there was a decrease in output in all districts except Fort Steele and Nelson, and shows that the different mines throughout the Province were forced to curtail their outputs.

The Fort Steele District this year made an output over double that of 1919, and this year leads all the other districts. This great increase is due to the great output of the *Sullivan* mine, owned by the Consolidated Mining and Smelting Company, of Trail. The *North Star* mine produced about 1,330,000 lb. lead.

In the Slocan District the heaviest producer in 1920 was the *Silversmith*, followed by the combined Clarence Cunningham mines and the *Standard*.

In the Ainsworth Division the largest producer was the *Florence*, with an output of about 1,500,000 lb., followed by the *Bluebell*, with approximately 1,400,000 lb., and fourteen smaller shippers.

The lead production of Nelson Division comes mainly from the *Emerald* mine, and this mine produced very much more than in the previous year.

The production from Windermere-Golden was chiefly from the *Paradise* mine, with a production of about 911,258 lb., and three small shippers.

ZINC.

The quantity of zinc produced in 1920 amounted to 47,208,268 lb., which, compared with 56,737,651 lb. produced in 1919, shows a decrease of 9,529,383 lb. This production is valued at $3,077,979, which shows a decrease, as compared with the 1919 value, of $462,450, or about 17 per cent.

The zinc market was not as much affected as the copper and lead markets by the transition period from war demands to peace conditions, with the result that the price of the metal did not fluctuate greatly and production continued uninterruptedly.

During the latter half of 1920, although the prices of the metal were sustained, there were but small sales and the market for zinc ore disappeared, while many zinc-smelting plants and mines on this continent closed down temporarily at least.

The average price in New York for the year was about 7.9 cents a pound; the market price at end of the year was about 5.8 cents.

The following table shows the production of zinc according to districts, for the years 1919 and 1920:—

	1919. Lb.	1920. Lb.
Fort Steele	46,460,703	42,881,092
Slocan	10,015,624	3,715,471
Omineca	224,539	453,512
Ainsworth	36,785	158,193
All others	.....	.....
Totals	56,737,651	47,208,268

Some uncertainty was felt as to the production of zinc this year, as labour troubles have been general in the zinc-producing districts and considerable ore has been shipped to the United States.

From the above table it would seem that most of the zinc ore mined in the Province this last year was from the Fort Steele District. The output in this district was made chiefly by the *Sullivan* mine, and was due to a large tonnage being sent to the Consolidated Company's electrolytic zinc-refinery at Trail, where the ore is treated.

In the Slocan District the heaviest shipper was again the *Standard*, with a production of nearly 2,000,000 lb., which, however, is about 2,500,000 lb. less than in 1919. The next largest shipper was the *Idaho* mill, followed by the *Silversmith*.

The figures for Ainsworth show a greatly increased production.

The Omineca production is mainly a silver-zinc concentrate from the *Silver Standard* mine at Hazelton.

OTHER MINERALS.

Iron. So far there has been no metallic iron produced in British Columbia, but it has been strongly advocated in many quarters that the conditions are favourable for the establishment of an iron-smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established. As is well known, there is on the Coast, in the aggregate, an adequate supply of magnetite-iron ore, quite sufficiently free from impurities as to be within the "Bessemer limit" to supply ore for such a plant.

Further investigation of the Taseko limonite-deposits was made during 1920 by a party sent out by the Department of Mines. The deposits were also examined in detail by Dr. J. D. MacKenzie, of the Geological Survey of Canada.

The only shipment of iron ore made this past year was of 220 tons from the *Iron King* at Alta Lake to Vancouver.

Platinum. The well-known fact of the wide occurrence of platinum throughout the Province in connection with our placer-gold deposits gives reasonable hope that such may be found in payable quantities and justifies further investigations. As far as reports received indicate, the only output this year is about $400 worth from the Similkameen District.

Molybdenite. Since the Armistice the market is dormant, like other metal prices, but nominal quotations vary from 75 cents to $1 a pound. No advice has been received of any shipment this year.

Chromite. In 1918 about 800 tons of chromite ore, carrying from 30 to 45 per cent. chromic oxide, was shipped from the *Mastodon* claim, Grand Forks Division; and a deposit on Scottie creek, near Clinton, was opened up, but no shipments were made. With the end of the war the market for chromite temporarily collapsed, as large stocks were available, with no purchasers in sight. It is believed that no ore was shipped in 1919 or 1920.

Manganese. Nearly 600 tons of manganese ore, running over 50 per cent. manganese and less than 20 per cent. silica, was shipped from the *Hill 60* property on Cowichan lake before the roads became impassable through winter rains. The company has installed an aerial tramway, which should prevent, in the future, interruption to sustained shipments. During the latter part of the year shipments ceased and development-work only was carried on.

Non-metallic Minerals. About 7,500 tons of fluorspar concentrates was shipped from the *Rock Candy* group, in the Grand Forks Division. This property is owned by the Consolidated Mining and Smelting Company and is equipped to make steady shipments in the future. The growth of this property has been very interesting during the last two or three years. The property is now equipped with an efficient concentrating-mill, in which about 20,000 tons of ore was treated, producing nearly 7,500 tons of concentrates, carrying about 87 per cent. calcium fluoride and 6 per cent. silica, and having a total value of about $175,000. The mineral is shipped to the Trail smelter and is used for making hydrofluoric acid, which is used in the lead-refinery, and to other points in Canada and to the United States.

Shipments of magnesium sulphate (Epsom salt) were made from Spotted lake, Osoyoos Division, but figures have not been obtained. About 1,100 tons of magnesium sulphate was said to have been shipped from deposits of this material near Clinton.

Deposits of hydromagnesite in the Clinton Division, which are reported to be large and of great purity, have attracted considerable attention during the past year. No shipments have been recorded.

A production of arsenic valued at $22,000 was made by the *Nickel Plate* mine in 1920.

Talc.—Some 100 tons of talc was mined and ground in the Victoria Mining Division, for which product there appears to be a large demand.

Iron Pyrites.—At the *Sullivan* mine in East Kootenay some 4,300 tons of iron pyrites was mined and shipped to Trail.

COAL.

The gross production of coal in 1920 was 2,696,774 long tons, of which 101,649 tons was made into coke, leaving the net production at 2,595,125 tons. These figures show an increase, as compared with 1919, of 287,826 tons gross and of 327,584 tons net. The quantity of coke made was 67,792 tons, which is a decrease of 23,346 tons as compared with 1919. For purposes of comparison the following table is shown:—

	1915.	1916.	1917.	1918.	1919.	1920.
Coal, gross.....tons, 2,240 lb..	1,972,580	2,485,580	2,398,715	2,578,724	2,408,948	2,696,774
Less made into coke "	361,451	401,487	248,740	276,479	141,407	101,649
Coal, net..... "	1,611,129	2,084,093	2,149,975	2,302,245	2,267,541	2,595,125
Coke made..... "	245,871	267,725	159,905	188,967	91,138	67,792

Summarizing the Provincial production of coal, the following table shows the output:—

		1917.	1918.	1919.	1920.
Vancouver Island mines	tons, 2,240 lb.	1,695,721	1,666,211	1,699,348	1,698,254
Nicola and Similkameen mines	"	151,243	179,179	149,042	149,731
Crowsnest mines	"	551,751	732,864	558,806	847,389
Omineca-Telkwa	"	.....	470	1,752	1,400
Total quantity of coal mined	"	2,398,715	2,578,724	2,408,948	2,696,774
Less made into coke	"	248,740	276,479	141,407	101,649
Net quantity of coal produced	"	2,149,975	2,302,245	2,267,541	2,595,125

In addition to the above net production of coal, there was made the coke production shown in the following table:—

		1917.	1918.	1919.	1920.
Vancouver Island collieries	tons, 2,240 lb.	30,406	24,887	34,071	*Nil*
Nicola and Similkameen collieries	"	*Nil*	*Nil*	*Nil*	*Nil*
Crowsnest District collieries	"	129,499	164,080	57,067	67,792
Total coke production	"	159,905	188,967	91,138	67,792

As will be seen from the above figures, the net coal production this year is 327,584 tons more than it was in 1919, and greater than it has been since 1912.

The production of coke in 1920 was 67,792 tons (2,240 lb.), which is 23,346 tons less than the preceding year. This gross coke production was made by the Crow's Nest Pass Coal Company in East Kootenay.

The greater part of the gross Provincial coal production is still being mined by three companies—the Crow's Nest Pass Coal Company of East Kootenay, the Canadian Collieries (Dunsmuir), and the Canadian Western Fuel Company of Vancouver island, which mined, collectively, 77 per cent. of the gross output.

Of the other collieries: In the Coast District, on Vancouver island, the Pacific Coast Coal Mines, Limited, produced 94,904 tons; the Nanoose Collieries, Limited, 32,500 tons; and the Granby Company, from a new colliery near Cassidy, produced 201,589 tons. In the Nicola Valley section of the district, the Middlesboro Colliery Company mined 87,602 tons; the Fleming Coal Company 32,122 tons; the Princeton Coal and Land Company 20,717 tons; the Coalmont Colliery 8,983 tons; and the Chu Chua Colliery 307 tons of coal.

A new coalfield has been opened up in the Omineca District, where a small colliery is being developed on the Telkwa river that last year shipped 1,400 tons of coal. For convenience this has been included in the Coast District figures.

In the East Kootenay District, in addition to the Crow's Nest Pass Coal Company, which produced 696,375 tons, the Corbin Coal and Coke Company produced 151,041 tons.

The collieries of the Coast District, including the Nicola-Princeton and Telkwa fields, are to be credited this year with about 69 per cent. of the total coal-output.

The gross output of the collieries of the Province for the past year was, as already stated, 2,696,774 tons; there was also 56,244 tons of coal taken from stock.

Of this gross amount, there was sold for consumption in Canada, 1,384,005 tons; sold for consumption in the United States, 792,293 tons; sold in other countries, 7,647 tons; making the total coal sales for the year 2,183,945 tons of 2,240 lb.

In addition to the coal sold, there was used in the manufacture of coke 101,649 tons, and used under companies' boilers, etc., 261,312 tons; while 206,112 tons was lost in washing and screening.

The coke sales of the Province for the past year amounted to 67,523 tons, and a further 269 tons was added to stocks on hand.

The following table indicates the markets in which the coal and coke output of the Province was sold:—

Coal.	Coast District.	Crowsnest Pass District.	Total for Province.
Sold for consumption in Canada ....tons, 2,240 lb.	1,178,929	205,076	1,384,005
" export to United States ..... "	312,951	479,342	792,293
" export to other countries ..... "	7,647	.....	7,647
Total coal sales	1,499,527	684,418	2,183,945
Coke.			
Sold for consumption in Canada .....tons, 2,240 lb.	.....	35,805	35,805
" export to United States ..... "	....	31,718	31,718
" export to other countries..... "	.....	.....	.....
Total coke sales	.....	67,523	67,523

Collieries of Coast District.

The Collieries of the Coast District, which includes those on Vancouver island and in the Nicola-Princeton fields, and a small colliery on Telkwa river mined 1,849,385 tons of coal in 1920, in addition to which 58,769 tons was taken from stock, making 1,908,154 tons distributed from these collieries in 1920. This amount was distributed thus:—

	Tons.	Tons.
Sold as coal in Canada	1,178,929	
Sold as coal in United States	312,951	
Sold as coal in other countries	7,647	
Total sold as coal		1,499,527
Used under companies' boilers, etc.		202,515
Used in making coke		.....
Lost in washing, etc.		206,112
		1,908,154
Minus coal taken from stock		58,769
Gross output		1,849,385

The total coal sales of the Coast collieries for the year show, as compared with the sales of the previous year, an increase of 117,408 tons, equivalent to about 8 per cent.

The coal sold in Canada by the collieries of the Coast District this year shows an increase of 187,452 tons, or about 18 per cent. from the preceding year; the amount exported to the United States was 77,691 tons less than the preceding year, a decrease of about 20 per cent.

There was no coke produced in the Coast District this year.

On Vancouver island five companies produced coal this year—the Canadian Collieries, Limited, the Canadian Western Fuel Company, the Granby Consolidated Mining, Smelting, and Power Company, the Pacific Coast Coal Mines, and the Nanoose Collieries, Limited; the majority of these companies each operate two, or more, collieries. The combined gross output of the Island collieries was 1,698,254 tons.

In the Nicola and Princeton coalfields of the Coast District, the Middlesboro Colliery Company produced 87,602 tons of coal; the Fleming Coal Company 32,122 tons; the Princeton Colliery, 20,717 tons; the Coalmont Collieries, 8,983 tons; and the Chu Chua Collieries, 307 tons.

The total output of this portion of the sub-district was 149,731 tons. The Telkwa Collieries produced 1,400 tons.

EAST KOOTENAY COALFIELD.

There were only two companies operating in this district this past year—the Crow's Nest Pass Coal Company, operating two separate collieries, the combined output of which was 696,375 tons; and the Corbin Coal and Coke Company, which made an output of 151,014 tons; making a gross output for the district for 1920 of 847,389 tons of coal.

Of the coal mined, 2,525 tons was added to stock, making the amount of coal distributed from the collieries 844,864 tons.

Of this gross tonnage, 101,649 tons was used in the manufacture of coke, of which there was produced 67,792 tons (2,240 lb.).

The coke sold this year amounted to 67,523 tons, in addition to which 269 tons was added to stock.

The following table shows the distribution made of the coal of this district:—

	Tons.	Tons.
Sold as coal in Canada	205,076	
Sold as coal in United States	479,342	
Total sold as coal		684,418
Used by the companies in making coke		101,649
Used by the companies under boilers, etc.		58,797
		844,864
Plus coal added to stock		2,525
Gross output		847,389

BUILDING MATERIALS.

The output during 1920 of structural materials, such as cement, lime, building-stone, sand and gravel, brick and other clay products, was considerably greater than in the preceding year, being $2,176,460 as against $1,148,485.

Approximately 90 per cent. of the total production of building materials comes from the Coast District, and the larger part of this finds its markets in the Coast cities.

It is probable that an output amounting to about $1,000,000 represents the steady yearly demand for these materials for use in repairs, renewals, and various small demands, with but little new construction-work, and the increment shown in this year's production would seem to indicate a revival of new construction-work and a partial recovery from war-time depression.

The increase in the cement-output, which is more than 200 per cent. greater than in 1919, is a pretty sure indication of building activity.

On the other hand, there has been practically no production of building-stone, and only a small production of red brick, which would seem to indicate the substitution of concrete for stone and brick.

Building-stone. Excellent building-stone of various sorts is found in abundance in almost every part of the Province; the fact of its widespread distribution has, however, been somewhat against the establishment of large quarrying industries, as a sufficient local supply could always be obtained, and, except within reach of the larger cities, few regularly equipped quarries have been opened.

On the Coast, chiefly between Vancouver island and the Mainland, there are several well-equipped quarries taking out granite, sandstone, and andesite, all of excellent quality. These quarries supply the stone building material of the Coast cities, and have also exported to the United States.

A detailed description of the more important quarries was given in the Report of this Bureau for 1904.

Red Brick. The sale of red brick during the past year was about 6,100 M.; the price varies from $12 to $17 a thousand, according to quality and demand. This small output shows very clearly that but little construction-work has been carried on. It is probable, however, that a considerable quantity of brick is still imported into the Province.

Firebrick. The only company producing firebrick in the Province is the Clayburn Company, Limited, with a plant at Clayburn. The fireclay is found here as a bed occurring in bedded rocks of Eocene age. Shales, sandstones, and conglomerates, all but little consolidated, make up this sedimentary series. The shales are quarried or mined for brick-making and one bed is an excellent fireclay. Associated with these rocks is a bed of lignite which is sufficiently good to be used for firing the boilers of the plant. Firebrick is the principal manufactured article produced by this company, but, in addition, considerable quantities of common brick, paving-brick, tiles, drain-pipes, and prepared fireclay are made.

Lime. The manufacture of lime is conducted in a small way at a large number of points in the Province, but only on the Coast has any attempt been made at more extensive operations. In the neighbourhood of Victoria, on Esquimalt harbour, two kilns are in operation, and there is a kiln on Saanich inlet. On Texada island—in addition to the plant at Marble bay—a new and extensive plant was erected at Blubber bay a few years ago. The limestone being used is of exceptional purity, but in some instances the limestone-beds are cut by igneous dykes which have to be rejected, and this somewhat increases the cost of quarrying.

The production of lime and limestone for 1920 is valued at $338,151, as compared with $204,538 in 1919; of this about $48,000 worth of limestone was quarried for use as smelter flux by the Granby and Consolidated Companies and $25,224 worth quarried by the paper and pulp mills for their own use.

Portland Cement. There were two large and well-equipped cement plants in the Province, both situated on Saanich inlet. These two concerns have recently been amalgamated under the name of the British Columbia Cement Company, with plant at Tod inlet, which made a production in 1920 of over $800,000. Portland cement is thus the most important item in the production of building materials.

Crushed Rock and Gravel. The returns for crushed rock and gravel indicate an increased demand for this material, although some of the plants have not been in operation for the past two or three years. During the boom years of 1911 and 1912 a number of well-equipped plants were put up near Vancouver and Victoria for supplying washed sand and gravel, properly screened to size. Some of these companies use a system of mining the gravel by hydraulic streams and carrying the product to the screens by the water used.

BUREAU OF MINES.

Work of the Year.

The work of the Bureau of Mines naturally increases year by year, this growing activity being due to the following causes: The extension of the mining area of the Province, with the proportional increase in the number of mines; the increasing desire of the outside public for the free information which the Bureau supplies with regard to the various mining districts and camps, and the appreciation by the prospector of the fact that he may obtain, gratis, a determination of any rock or mineral which he may send to the Bureau.

The routine work of the office, and the preparation and publication of the Report for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the Laboratory, fully occupied the staff for the year.

The permanent staff of the Bureau now consists of the Provincial Mineralogist and Assayer, Wm. Fleet Robertson; the Assistant Provincial Assayer and Provincial Analyst, D. E. Whittaker; John Adams as Laboratory Assistant; H. T. Nation, general office assistant; and S. Hodgkinson, clerk.

Mineral Survey Districts and Resident Engineers thereof.

During the session of 1917 the Hon. the Minister of Mines brought in the "Mineral Survey and Development Act," which was passed on May 19th, 1917, and under the provisions of which the Province was divided into six Mineral Districts, to each of which there was appointed a Resident Engineer with headquarters at a centrally located point in such district.

In the district to which he was appointed the Resident Engineer is expected to devote his whole time to the performance of the duties of his office, and to carry on continuously a mineral survey of his district, keeping records of the same and of the mining and mineral developments taking place, and at the same time to assist prospectors and others with such advice as may be necessary and may come within the scope of a mining engineer's work.

Aside from special reports which may be called for by the Minister, the Resident Engineers are expected annually to make a comprehensive report covering all matters relating to mining, mine development, and prospecting that have occurred within the year in their respective districts.

These annual reports of the Resident Engineers are given later in this general Report, and form the basis of the information given in respect to the mineral industry and its development within the Province.

The following are the six Mineral Districts into which the Province is divided, with the Mining Divisions included in each and the location of the permanent office of the district, with the name of the Resident Engineer appointed to each district:—

The North-western Mineral Survey District (No. 1) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Atlin, Stikine, Liard, Skeena, Nass River, Portland Canal, Bella Coola, and Queen Charlotte; and shall have its permanent survey station and office at the City of Prince Rupert. Resident Engineer, Geo. A. Clothier, B.Sc.

The North-eastern Mineral Survey District (No. 2) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Omineca, Peace River, Cariboo, and Quesnel; and shall have its permanent survey station and office at Hazelton, Resident Engineer, John D. Galloway, M.Sc.

The Central Mineral Survey District (No. 3) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale; and shall have its permanent survey station and office at the City of Kamloops. Resident Engineer, R. W. Thomson.

The Southern Mineral Survey District (No. 4) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Similkameen, Greenwood, Grand Forks, and Osoyoos; and shall have its permanent survey station and office at the City of Grand Forks. Resident Engineer, Philip B. Freeland.

The Eastern Mineral Survey District (No. 5) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Golden, Windermere, Fort Steele,

Ainsworth, Slocan, Slocan City, Trout Lake, Nelson, Arrow Lake, Revelstoke, Lardeau, and Trail Creek; and shall have its permanent survey station and office at the City of Revelstoke. Resident Engineer, A. G. Langley, B.Sc.

The Western Mineral Survey District (No. 6) shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Nanaimo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver, and New Westminster; and shall have its permanent survey station and office at the City of Nanaimo. Resident Engineer, W. M. Brewer.

ASSAY OFFICE.

The following is a summary of the work of the Assay Office of the Bureau of Mines for the year 1920 as reported by the Assistant Provincial Assayer, D. E. Whittaker:—

During the year 1920 there were made by the staff in the Government Assay Office, 2,658 assays or quantitative determinations; of these the majority were for the Bureau of Mines or for the other departments, for which no fees were received.

The fees collected by the office were as follows:—

Fees for analyses	$ 871 00
Fees for assaying	132 75
Fees for assayers' examinations	285 00
Total cash receipts	$1,288 75
Determinations and examinations made for other Government departments for which no fees were collected—	
Attorney-General's Department	$ 899 00
Agricultural Department	860 00
Board of Health	220 00
Treasury Department	27 00
Other departments	50 00
	$2,056 00
Value of work done outside of Mines Department work	$3,344 75

The value of gold melted during the year 1920 was $3,116 in 15 lots, as against $16,182 in 23 lots in 1919.

Free Determinations.

In addition to the above quantitative work, a large number of qualitative determinations, or tests, were made in connection with the identification and classification of rocks or minerals sent to the Bureau for a report; of these no count was kept, nor were any fees charged, as it is the established custom of the Bureau to examine and test qualitatively, without charge, samples of minerals sent in from any part of the Province, and to give a report on the same. This has been done for the purpose of encouraging the search for new or rare minerals and ores, and to assist prospectors and others in the discovery of new mining districts, by enabling them to have determined, free of cost, the nature and probable value of any rock they may find. In making these free determinations, the Bureau asks that the locality from which the sample was obtained be given by the sender.

A considerable amount of time was spent by the Assay Office staff testing for potash from deposits on the west coast of Vancouver island.

EXAMINATIONS FOR ASSAYERS.

REPORT OF D. E. WHITTAKER, SECRETARY OF BOARD OF EXAMINERS.

I have the honour, as Secretary, to submit the Annual Report for the year 1920 of the Board of Examiners for Certificates of Competency and Licence to Practise Assaying in British Columbia, as established under the "Bureau of Mines Act Amendment Act, 1899."

Examinations were held in Victoria, in the Government Laboratory, on April 12th, May 17th, and December 13th and the following days. Eleven candidates came up for examination. Seven

obtained the required number of marks and the Board recommended that Certificates be granted to them. Three candidates applied for exemption under section 2, subsection (2), of the Act, and the Board recommended that Certificates be issued to them.

In accordance with the recommendations of the Board, Certificates have been duly issued by the Honourable the Minister of Mines to the ten candidates.

List of Assayers holding Provincial Certificates of Efficiency under the "Bureau of Mines Act Amendment Act, 1899."

(Only the holders of such certificates may practise assaying in British Columbia.)
Under section 2, subsection (1).

Adams, J. B.	Victoria.
Archer, E. G.	Anyox.
Armstrong, N.	Vancouver.
Ayres, D. A.	
Austin, John W.	Vancouver.
Backus, Geo. S.	Britannia Beach.
Baker, C. S. H.	
Bagus, N. J.	Vancouver.
Barke, A. C.	
Beilby, E. B.	Vancouver.
Bernard, Pierre	Monte Christo, Wash.
Bishop, Walter	Grand Forks.
Broughton, F. W.	Vancouver.
Buchanan, James	Trail.
Buehman, A. S.	Trail.
Campbell, Colin	New Denver.
Carmichael, Norman	Clifton, Arizona.
Church, George B.	
Cobeldick, W. M.	Scotland.
Collison, H.	Cobham, England.
Comrie, George H.	Vancouver.
Craufurd, A. J. F.	Rossland.
Crerar, George	
Cruickshank, G.	
Davidson, J. R.	Vancouver.
Day, Athelstan	Dawson.
Dedolph, Ed.	
Dockrill, Walter R.	Chemainus.
Dunn, G. W.	Rossland.
Farquhar, J. B.	Vancouver.
Fingland, John J.	Kaslo.
Gardner, C. S.	Victoria.
Grosvenor, F. E.	Vancouver.
Hamilton, Wm. J.	Anyox.
Hannay, W. H.	Rossland.
Harsant, R. C. C.	Port Essington.
Hart, P. E.	
Hawkins, Francis	Silverton.
Hawes, F. B.	Vancouver.
Hodgson, A. R.	Anyox.
Hook, A. Harry	Greenwood.
Hurter, C. S.	Prince Rupert.
Irwin, George E.	Vancouver.
John, D.	Haileybury, Ont.
Kiddie, Geo. R.	California.
King, R.	
Kitto, Geoffrey B.	Victoria.
Lang, T. F.	Vancouver.
Langley, A. S.	Crofton.
Lee, Fred E.	Trail.
Lee, Geo. M.	Grand Forks.
Ley, Richard H.	Victoria.
Levy, Frank	
Lindsay, W. W.	Kimberley.
Longworth, F. J.	Boyds, Wash.
Laucks, I. F.	Seattle.
Manning, S. M.	Trail.
Martin, S. J.	
Marsh, Richard	Republic, Wash.
Marshall, H. Jukes	Vancouver.
Marshall, William S.	Ladysmith.
Meale, Eric A.	East Helena, Mont.
Merrifeld, T. T.	Trail.
Miles, Arthur D.	
Milne, A. S.	Vancouver.
Mitchell, Charles T.	Copper Cliff, Ont.
McCormick, Alan F.	Ruth, Nevada.
MacDonald, Alec C.	Vancouver.
McLellan, R. D.	Vancouver.
Morgan, Richard	Trail.
Nicholls, Frank	Norway.
Okell, S. E.	Vancouver.
Parker, Robt. H.	
Parsenow, W. L.	
Perkins, Walter G.	
Pickard, T. D.	Vancouver.
Pirrie, Noble W.	Ottawa, Ont.
Poole, H. W.	Vancouver.
Prior, C. E.	Hedley.
Richmond, Leigh	Duncan.
Robertson, T. R.	
Rodgers, Ch. B.	Vancouver.
Rombauer, A. B.	Butte, Mont.
Schroeder, Curt A.	
Segsworth, Walter	Toronto, Ont.
Shepherd, G. H.	North Vancouver.
Sharpe, Bert N.	
Shore, J. T.	Vancouver.
Sim, Chas. John	Monte Carlo.
Sloan, Wm.	Vancouver.
Snyder, Blanchard M.	
Steven, Wm. Gordon	
Stimmel, B. A.	Trail.
Stockly, Galt	Princeton.
Sundberg, Gustave	Mexico City.
Tally, Robert E.	Spokane, Wash.
Taylor, H. L.	Vancouver.
Thirkell, V. R.	Vancouver.
Thomas, Percival W.	Vancouver.
Tretheway, John H.	
Turner, H. A.	Vancouver.
Vance, John F. C. B.	Vancouver.
Van Agnew, Frank	Siberia.
Vaughan-Williams, V. L.	California.
Wales, Roland T.	
Watson, Wm. J.	Ladysmith.
Watson, Thomas	Vancouver.
Welsh, J. Cuthbert	Butte, Mont.
Wells, Ben T.	
West, Geo. G.	Vancouver.
Whittaker, Delbert E.	Victoria.
Widdowson, E. Walter	Nelson.
Willemar, Douglas R.	New Hazelton.
Williams, W. A.	Vancouver.
Williams, Eliot H.	
Williams, J. R.	Vancouver.
Wimberley, S. H.	Nevada, U.S.A.

Under section 2, subsection (2).

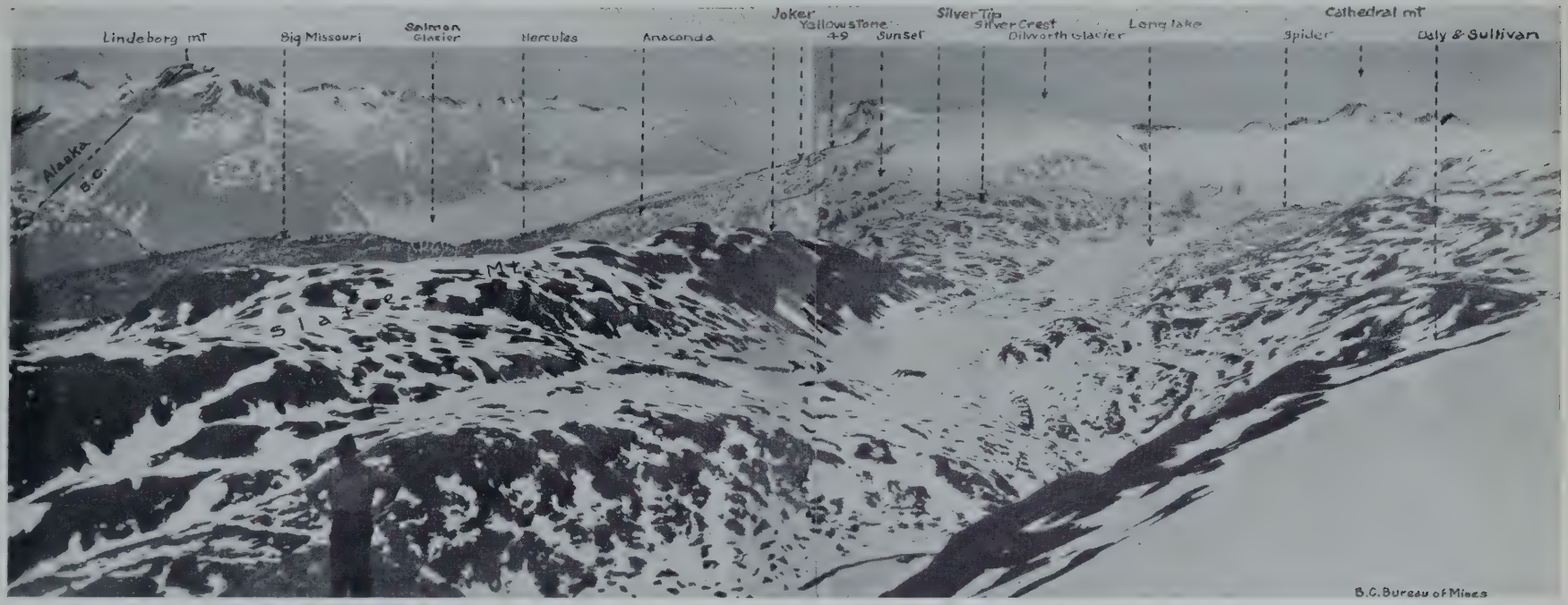
Archer, Allan		McGinnis, Wm. C.	Queen Charlotte Ilds.
Baylock, Selwyn G.	Trail.	McKay, Robt. B.	Vancouver.
Bissett, D. G.	Trail.	McLellan, John	Queen Charlotte Ilds.
Bolton, George E.	Silverton.	McMurtry, Gordon O.	
Brennan, Charles Victor	Victoria.	McNab, J. A.	Thompson, Nevada.
Browne, R. J.	Rossland.	McPhee, W. B.	
Browne, P. J.	Nelson.	McVicar, John	Edmonton, Alta.
Bryant, Cecil M.		Maclennan, F. W.	
Burwash, N. A.		Moran, P. J.	Vancouver.
Cavers, Thomas W.		Newton, W. E.	Sandon.
Clothier, George A.	Prince Rupert.	Oughtred, S. W.	Ainsworth.
Cole, Arthur A.	Cobalt, Ont.	Outhett, Christopher	Kamloops.
Cole, G. E.	Rossland.	Pemberton, W. P. D.	Victoria.
Cole, L. Heber	Ottawa, Ont.	Reid, J. A.	Cobalt, Ont.
Conway, E. J.	Vancouver.	Ritchie, A. B.	Nelson.
Coulthard, R. W.		Roaf, J. R.	
Cowans, Frederick		Roscoe, Harold M.	Anyox.
Dawson, V. E.	Trail.	Rose, J. H.	Thompson, Nevada.
Dempster, R. C.	Rossland.	Rutherford, R. C.	Trail.
Dempster, A. S.	Rossland.	Sampson, E. H. S.	Riondel.
Dixon, Howard A.	Toronto, Ont.	Scott, John Mitchell	Stewart.
Eardley-Wilmot, V. L.	Rossland.	Scott, Oswald Norman	
Eldridge, Gardner S.	Vancouver.	Shannon, S.	
Galbraith, M. T.		Sharpe, G. P.	Midland, Ont.
Gilman, Ellis P.	Vancouver.	Shorey, P. M.	Trail.
Green, J. T. Raoul	Blairmore, Alta.	Sloan, David	Three Forks.
Guess, George A.	Toronto, Ont.	Stevens, F. G.	Mexico.
Gwillim, J. C.	Kingston, Ont.	Stewart, A. G.	Vancouver.
Harding, Wilson M.		Stroud, J. E. C.	Anyox.
Heal, John H.		Sullivan, Michael H.	Kellogg, Idaho.
Hearn, Roy D.	Trail.	Sutherland, T. Fraser	
Hilliary, G. M.	Idaho, U.S.A.	Sutherland, Wm.	Glasgow, Scotland.
Johnston, William Steele	Lachine, Que.	Swinney, Leslie A. E.	
Kaye, Alexander	Vancouver.	Thompson, W. K.	Trail.
Kendall, George	Vancouver.	Thomson, H. Nellis	Anaconda, Montana.
Kidd, G. L.	Edmonton, Alta.	Thomson, Robt. W.	
Kilburn, Geo. H.	Rossland.	Watson, A. A.	
Lathe, Frank E.	Grand Forks.	Watson, Henry	
Lay, Douglas		Willis, F. S.	Trail.
Lewis, Francis B.	South Africa.	Winslow, R. H.	Vancouver.
Merrit, Charles P.		Wilson, Ridgeway R.	Fernie.
Murphy, C. J.	St. Catharines, Ont.	Workman, Ch. W.	
Musgrave, W. N.	England.	Wright, Richard	Rossland.
McArthur, Reginald E.		Wynne, Lewellyn C.	
McDiarmid, S. S.		Yuill, H. H.	

Under section 2, subsection (3).

Carmichael, Herbert	Victoria.	Marshall, Dr. T. R.	London, England.
Galloway, J. D. (Resident Engineer.)	Victoria.	McKillop, Alexander	Vancouver.
		Pellew-Harvey, Wm.	London, England.
Harris, Henry	Tasmania.	Robertson, Wm. Fleet (Provincial Mineralogist.)	Victoria.
Hedley, Robt. R.	Vancouver.		
Kiddie, Thos.	California.		

PREVIOUSLY ISSUED UNDER THE "BUREAU OF MINES ACT, 1897," SECTION 12.

Pinder, B.		Thompson, James B.	Vancouver.



Headwaters of Salmon River, Portland Canal M.D.

SALMON and BEAR RIVER

SECTIONS

PORTLAND CANAL M.D.

0 1 2 3 4 miles

To accompany Report of
G.A. Clothier, Resident Engineer
1919

SUMMIT LAKE
Divide
Pass
DIVIDE LAKE
DILWORTH GLACIER
Yellowstone
49 cabin
Silver Crest
Spider
Montana Sunset
Silver Tip
Unicorn
Hercules
Harris cr.
LONG LAKE
Big Missouri
Mineral Hill
Monitor
SILVER LAKE
Daly & Sutliffe
SLATE MT.
No Name lake
Mother lode
Pay Roll
Boundary
Indian
Cobalt
Bush Mines Ltd.
Mistl
Northern Light
B.C. Silver Mines
INDIAN LAKE
Wood-bine
Premier
International
Log cabin
International
New Alaska (President Silver M.)
ELEVEN-MILE (Road House)
NINE-MILE
Mayflower
Prince John
Nabob
Lakeview
Rob Fannin
cabin
P.C. Mill
Sunshine cabin
L.L.
Columbia
Evening Sun
Portland Canal M.Co
Gibson
Ben Bolt
Bayview
Barney Gulch
STEWART
Molly B
Tide Flats
HYDER
MARMOT BAY
Portland Canal
Marmot river
Montana
North Fork Basin
Fraser
Fish cr.
International
Salmon River
Alaska
Bear River
Bear River Glacier
Mountain Boy
Cabin
Northern Terminus
Mt. JOHNSTONE
Rufus
Comet
Red Top
Vulcan
McIntominy
Divide
Strohn cr.
Grey Copper
George
Red Cliff
Indian cabin
Goose cr.
Mosquito cr.
Mt. GLADSTONE
Bear River
Cascade
Bear River
Glacier
Unexplored
Unexplored
Bromley Glacier
Portland River
Portland Canal
Cambria Valley
Canada
Watershed
Divide
Hanna
Old Churn
Rouge
Roosevelt
cabin
St. Elmo
Jutland
cabin
Bitter cr.
Bear River
Glacier
MEZIADIN LAKE
Nelson cr.
Porter
Porter cr.
Willoughby cr.
Unexplored

Key Map
Scale of Miles.
Stikine River
Iskut River
STIKINE MINING DIVISION
Echo Lake cabin
Nass River
PORTLAND CANAL MINING DIVISION
Wrangell
Boundary
Stewart
Hyder

B.C. Bureau of Mines

NORTH-WESTERN DISTRICT (No 1).

Report of Geo. A. Clothier, Resident Engineer.

INTRODUCTORY.

This district comprises the following eight Mining Divisions of the Province: Bella Coola, Skeena, Queen Charlotte, Nass River, Portland Canal, Stikine, Liard, and Atlin; the first three taking in the coast portion of this district, the remainder lying behind or east of the Alaska strip.

The boundaries of the two Divisions, Nass River and Portland Canal, have been somewhat altered this year, the upper or north half of the former being added to the latter. This change was thought advisable for the convenience of prospectors and others who had occasion to look up any records of claims located in the Meziadin Lake, Upper Nass, and Unuk River areas. Heretofore the records of claims in these areas, though reached by way of Stewart, were kept in Anyox. Claims staked in the Unuk River section can be attested to in Prince Rupert Recording Office and forwarded to Stewart for recording.

The main geologic and geographic features of the district, and the most likely prospecting areas and how to get to them, were outlined in last year's report. Of the three belts or zones into which the district may be divided—viz., the Coast Range granites, the Western Contact Belt, and the Eastern Contact Belt—the last mentioned has had the greatest amount of prospecting and development this year, though the increase in the number of prospectors throughout the district has been very evident. With the exceptions of the two centres of activities, Stewart and Alice Arm, there is room for hundreds of prospectors. When the comparatively small areas on the Eastern Contact Belt at the heads of Portland canal and Observatory inlet are compared with the remaining, absolutely unexplored portion of the belt, from the head of Salmon river north to Atlin, a distance of 250 miles, some idea of the enormity of the mineralized country and its wonderful probabilities can be gained. The discovery and development of a few more properties such as the *Granby* mine at Anyox, the *Dolly Varden* at Alice Arm, the *Premier* at Stewart, and the *Engineer* in Atlin would make it the greatest mineral-producing belt in the Province. While there is a great deal of it that is inaccessible, very appreciable proportions can be opened up from the Unuk river, the Stikine and Iskut rivers, and the Taku river, which empties into Taku arm just below Juneau. It is a well-demonstrated fact in this north country that it takes years to prospect, explore, and develop any region to the producing stage, and the Province should therefore make every effort to make these areas accessible to the prospector as soon as possible. The policy of keeping development and ore reserves well ahead of production applies equally as well to the Province as to the individual mine.

Though developments are proving that the formations of the Eastern Contact Belt are particularly favourable for the occurrence of the economic minerals, the Coast granites and the Western Contact Belt, with their exceptionally fine transportation facilities, should not by any means be overlooked by the prospector. A low-grade ore that would be of no value on the Eastern Contact Belt could make a mine on tide-water. The importance of the massive granites as a prospecting-field is exemplified in the quartz-deposits of the *Belmont-Surf Inlet* mine and others on Princess Royal island which lie in crushed and sheared zones in the solid granite. Replacements along intruding dykes in the granite is another type of deposit, such as the *Drum Lummon* on Douglas channel. Within the granite area are also broad belts of highly metamorphosed sedimentary rocks which have evidently been in a very favourable position to become heavily mineralized from the waters and heat escaping from the surrounding granite. The immense bodies of solid iron pyrite, carrying small amounts of copper as chalcopyrite, found on the Ecstall river are excellent examples of this type of deposit.

The Western Contact Belt is highly altered sedimentaries intruded by many spurs and masses from the main granite range, as well as by dykes of all kinds of igneous rocks, all tending to produce conditions conducive to the circulation of mineral-bearing solutions and ore-deposition. Apropos to this the following excerpt from F. W. and C. W. Wright's report is quoted: "It is probable that at many points along the western flanks of the batholiths (granites) the schists

now visible were so deeply buried at the time of the intrusion that the invading granite did not alter them so materially as to produce wide contact change. Strata near the surface at the time of intrusion should show more pronounced alteration from the magmatic solutions and the heat. It is significant that in these deep-seated schists and gneisses near the granite-contact no ore-bodies of consequence have been found, while rocks farther away from the granite and nearer the surface during its invasion in many localities show traces of contact metamorphism, as in spotted schists, and contain valuable metalliferous deposits."

While the off-shore islands as well as the Queen Charlotte group are in general well mineralized, there have not as yet been developed any large bodies of shipping-grade ore. Farther north, however, on the larger islands off the Alaska coast, there are several shipping properties. The *Salt Chuck* mine at the head of Kasaan bay, on Prince of Wales island, should be particularly noted, since it is the only mine on the Coast shipping ore in which the chief values are in palladium. The ore is a basic igneous rock, gabbro, carrying bornite disseminated and in small bunches. It therefore would be well for prospectors to have similar ore tested for platinum and palladium.

The Mining Situation.

The past year has done much toward clearing the mining air in this district, and I believe that conditions are better and the outlook more favourable than ever before. Conditions were rather "feverish" in the spring owing to the many incorporations by broker operators who had the *Dolly Varden* and *Premier* veins "extended" for miles in all directions; however, the public were conservative in speculating in such promotions and the "boom" did not advance very far for that class of mining.

The provisions in the "Mineral Survey and Development Act" for the protection of investors (it would be impossible to protect speculators) are having a good effect in lessening "wild-catters." The investor should obtain information of the property from the prospectus which is required to be filed with the Registrar of Joint-stock Companies and submitted to the Resident Engineer, instead of being influenced by newspaper and handbill advertising.

Apparently, many prospectors are not aware of the fact that provision is also made whereby any one taking an option on their claims, either to purchase or to work, must give security for wages, payable every two weeks, to the Gold Commissioner, Government Agent, or Mining Recorder, otherwise they are personally liable for such wages. It would save a lot of trouble if every prospector, or any one in any way connected with mining, would familiarize himself with the "Mineral Act" and the "Mineral Survey and Development Act."

A great amount of work has been done in the Stewart and Alice Arm regions by companies and individuals who have had properties under option, and by the claim-owners themselves. While some of the results have been disappointing, in general they have been distinctly encouraging. In many cases the continuation of operations depended on the striking of high-grade ore, and this failing to happen the options were thrown up. Such properties are far from being condemned and will now be available to those with adequate capital to conclusively test them. It is being realized that it is not a "poor man's country."

There are a number of properties throughout the district under development that give every promise of reaching the shipping stage.

While Alice Arm and Stewart have probably been the centres of activities, the increase in the number and operations of prospectors in other sections of the district has been noticeable. The Coast and Coast islands have had considerable prospecting; the Queen Charlottes have been investigated by several engineers, and later in the fall and this winter much interest is being taken in the oil-shale areas on Graham island; the Kitsumgallum Lake section has had a lot of prospecting; and reports from the Atlin and Rainy Hollow sections show more lode-mining than for some years.

The Dease Lake country, while not making the production this year anticipated on account of the amount of dead-work that has had to be done, has nevertheless had quite a revival of interest in placer and hydraulic mining, and with the amendments to the "Placer Act" regarding leases coming into effect this year more extensive development may be expected. General conditions affecting gold-mining have, of course, been particularly severe on this outlying section, and combined with extreme scarcity of labour and the difficulties of transportation it is worthy of note that there has been any activity. The Atlin placer-diggings have had a very quiet year, there being fewer men engaged in this class of mining than for several years.

Transportation facilities have been greatly improved in all parts of the district, providing ways for getting in machinery for exploratory and development work and getting out ore. A great deal of assistance has been given by the Mines Department to claim-owners for trails to their holdings; to prospectors for rough trails into new areas; and in sending reconnaissance parties into new fields.

The returned soldier prospector scheme was tried out during the summer and proved fairly successful in so far as my district is concerned. About 50 per cent. of the men took a real interest in the work.

The Geological Survey of Canada completed its work in the Salmon River area this summer and made a preliminary topographical survey of the Kitsault River area. The Salmon River work was started in 1919 by Dr. J. J. O'Neil and completed this year by Dr. S. J. Schofield. The wide publicity given this area as an important producer of bonanza gold and silver ore will make the report and maps of great interest, not only to the local prospector and operator, but to all interested in the occurrence of such ore. It is to be hoped that this report and accompanying maps will be available at an early date.

Similar work in 1921 in the Kitsault River area would be of great value to that important mining section.

The following is a list of the shipping properties in District No. 1 and their outputs for 1920:—

Production for 1920 from District No. 1.

Name of Property.	Location.	Ore Mined.	Gold.	Silver.	Copper.
		Tons.	Oz.	Oz.	lb.
Granby Consolidated Mining, Smelting, and Power Co., Ltd.	Anyox	802,667	7,615	381,742	25,404,950
		17,786*	1,715	58,064	.....
		18,000†	.....	.....	.....
Golskiesh Mines, Ltd.	Anyox	3,454	475	1,960	.....
Taylor Engineering Co., Ltd. (Dolly Varden)	Alice arm	93‡	.....	82,298	.....
		27,944	.....	749,340	.....
Esperanza group	Alice arm	18	4	3,788	.....
Premier Gold Mining Co., Ltd.	Stewart	799	2,283	77,180	.....
Patterson group	Porcher island	9	41	17	.....
Ikeda Mines, Ltd.	Ikeda bay	141	27	305	21,088
Drum Lummon Mines, Ltd.	Drum Lummon Bay	1,000	35	928	42,109
Belmont-Surf Inlet Mines, Ltd.	Surf inlet	108,082	44,051	20,104	685,259
Totals for 1920 (exclusive of placer)		979,993	56,246	1,375,726	26,153,406
Totals for 1919 (exclusive of placer)		758,857	60,076	920,413	20,411,421
Increase		202,904	.....	455,313	5,731,985
Decrease		.....	3,820	.....	.....

* Fluxing quartz containing values. † Fluxing quartz containing no values. ‡ Sorted.

The placer-gold production of Atlin, Stikine, and Liard Divisions was $138,600, a decrease from that of 1919 of $38,400. The production from Skeena, Nass River, Portland Canal, and Queen Charlotte Divisions was $3,000, as compared with $17,000 in the preceding year.

Note by the Provincial Mineralogist.—The official returns of the Granby Company show that there was mined and smelted 802,667 tons of copper ore, containing 7,615 oz. gold, 381,742 oz. silver, and 25,404,950 lb. copper (losses in slag deducted). In addition, there was mined or quarried and used as flux in smelting the copper ore 35,786 tons of quartz, valued at $150,000, and 47,189 tons of limestone, valued at $48,000. In compiling the statistical tables for this Annual Report the value of this quartz and limestone flux has been placed in Table V. under the heading of "Crushed Rock and Flux," and the gold and silver contents of a portion of the quartz flux have not been entered in Table IX. The figures of metal production given by Resident Engineer Clothier in the above table differ, therefore, from the district totals in Table IX. by the amount of gold and silver contained in the quartz flux.

It will be seen by the above production that this year's output exceeds last by about $770,621, and compared with the output of 1915, the first full year of the Granby Consolidated operation at Anyox, of $4,400,000 shows an increase of $2,500,000 in five years. In that time the *Belmont-Surf Inlet*, *Premier*, and *Dolly Varden* mines have been added to the shipping-list.

This year the district produced about 46 per cent. of the gold, about 39 per cent. of the silver, about 58 per cent. of the copper, and altogether about 35 per cent of the total mineral production of the Province, including lead and zinc, of which there is no production in this

district. The increase in tonnage mined was over 180,000 tons. The only decrease in values was in gold, which fell off about 8,000 oz., due to the decrease in placer output and the smaller yield from the *Belmont-Surf Inlet* mine. Silver increased about 400,000 oz., due mainly to the splendid production of the *Dolly Varden*, and also to a substantial increase in the Granby output. Copper increased by 5,742,000 lb., due entirely to the increase of Granby's output of that metal.

The shipments from the *Premier* were less in value this year than last, though the tonnage was about 311 tons greater. The returns show 1,000 oz. less gold and 31,000 oz. less silver.

The Taylor Engineering Company's *Dolly Varden* mine increased its tonnage from 6,700 to 28,037 tons, the silver content increasing from 423,952 to 831,638 oz., or double of last year.

The *Belmont-Surf Inlet* mine increased its tonnage, mined and milled, by about 6,000 tons, but a decrease is noted in gold, amounting to over 7,000 oz.; in silver, 10,000 oz.; and in copper, about 125,000 lb.

The Granby Consolidated this year smelted 172,700 tons more than last year and materially increased its production of gold, silver, and copper. The increase in gold amounted to 4,470 oz., due to the increased tonnage smelted and to the gold contents of the quartz mined at Granby point and used for fluxing purposes. The silver increase was 71,400 oz., the excess over normal production being also due to the silver contents of the Granby Point quartz. The copper increase amounts to 5,860,000 lb. The by-products output of this company is given under the heading of the Granby Consolidated.

There is every reason to believe that the above-mentioned heavy producers can at least maintain their output for several years to come. In the case of the Premier Gold Mining Company the production next year will show a large increase; in fact, at the time of writing this, the middle of February, about $500,000 in gold and silver values have been shipped. Taking everything into consideration—the maintenance and probable increase of the outputs of the present producers, the very favourable outlook for more properties developing to the shipping stage within the next year or two, and the number of promising prospects throughout the District—I see no reason for other than a very optimistic forecast for the mining industry in this portion of the Province.

The district will be reviewed under the main headings of the Mining Divisions, subdivided into sections, as follows:—

Bella Coola Mining Division.

Queen Charlotte Mining Division—Graham Island section; Moresby Island section.

Skeena Mining Division—Coast section; Grand Trunk Pacific section; Kitsumgallum Valley section; Lakelse Valley (Thornhill Mountain) section.

Nass River Mining Division—Observatory Inlet section; Hastings Arm section; Alice Arm section; Kitsault River section; Illiance River section.

Portland Canal Mining Division—Portland Canal (proper) section; Marmot River section; Bear River section; Salmon River section; Meziadin Lake section; Unuk River section.

Stikine Mining Division—Stikine River section; Iskut River section.

Liard Mining Division—Dease Lake Section.

Atlin Mining Division—Rainy Hollow section; Atlin section.

BELLA COOLA MINING DIVISION.

Interest is being shown in the magnetite-iron deposits on Seymour inlet, Dean channel, etc., as the prospects of the establishment of a steel industry on the Coast become more probable.

The Smelters Steel Company has been mining and shipping magnetite from its property on Dean channel to its smelter in Seattle.

Some stakings and yearly assessments on old claims are about all there is to report on mining.

SKEENA MINING DIVISION.

This Division takes in about 200 miles of the Coast range and Coast line and islands to the mouth of Portland inlet, and also includes a small portion of the Eastern Contact Belt from Lakelse lake north to the southern boundary of the Nass River Mining Division.

The outer Coast islands consist mainly of altered sedimentaries and probably mark the immediate contact of the Western Contact Belt with the main granites. The granite range is penetrated almost to the Eastern Contact by Douglas channel and Gardner canal. The latter

will, in all probability, some time be the outlet for all that mineral area east of the Coast range and known as the Sibola country.

Any part of the Coast or islands may now be reached from the different canneries and mills which are ports of call for Coast-plying boats. Prince Rupert, the western terminus of the Grand Trunk Pacific, is the distributing centre for up and down the coast, the Queen Charlottes, and the Interior.

There has been a noticeable increase in the amount of prospecting done this year throughout this Division. Prospectors will find that they will have no trouble in having their claims investigated, since there are Engineers in the field at all times who are very willing to look up anything of merit.

Coast Section.

This includes all the Coast islands and any part of the mainland on tide-water.

Belmont-Surf Inlet Mines, Ltd. This is a subsidiary company of the Tonopah-Belmont Development Company. The property and plant have been fully described in former reports; consequently this will be only a review of this year's operations. Development-work consists of 2,444 feet of raises, 1,900 feet of drifting, 911 feet of crosscuts, distributed over all the mine, and 133 feet of shaft-sinking to the new 900-foot level, a total of 5,388 feet. The mine has now three levels—700, 800, and 900—below the main working-tunnel, the 550-foot level. Ore has been proven on the 900-foot level on the west vein and is now being drifted on north from the shaft. New ore-bodies have been opened up during the year on the upper levels between the east and west veins and consist of irregular lenses, in many cases connected with the main veins.

Several new buildings have been added to the mine camp, including another bunk-house, laundry, a fine recreation-hall, a locomotive-shed, and seven cottages, making it one of the best-equipped mining camps, in every way, in the Province.

There were mined during the year 108,082 dry tons of ore, of which 107,976 tons went to the concentrator and 107 tons shipped direct to the Granby smelter at Anyox. Of the total tonnage mined, 100,313 tons was produced from stoping and 7,770 tons from development-work.

From the milling-ore 9,687 tons of concentrates was produced, which was shipped to Tacoma, yielding: Gold, 44,051 oz.; silver, 20,104 oz.; copper, 685,259 lb. Comparing these returns with those of last year, it will be seen that, though the tonnage is the greatest yet produced, the average metallic contents of the mine-run is somewhat lower, and the quantities of the three metal products therefore under the output of last year.

The average number of men employed throughout the year was 198—102 underground and 96 on the surface. Labour was scarce for the first ten months of the year, cutting down the year's output by about 25 per cent.

Development-work was carried on all year in the *Pugsley* mine, which has been purchased by the company. Over 2,000 feet of drifting has been done on this property.

The staff at the property consists of F. W. Holler, superintendent; E. W. Hawkins, auditor; F. H. Penn, mill superintendent; and C. P. Seale, mine superintendent.

Well's Claims. This group is owned by Fred Wells, who was one of the original owners of the *Belmont-Surf Inlet* property. It is situated about a three-hour walk from the *Belmont-Surf Inlet* camp. Mr. Wells has built a fair foot-trail to the property, but the short distance in which to attain the elevation of the camp, 2,300 feet, makes it very steep in places. However, he has packed up his whole outfit, consisting of a car, rails, blacksmith outfit, mining-tools, etc., on his back, and driven a tunnel about 300 feet long.

The general rock formation is massive granite in which a shear-zone up to 10 feet in width has been partially replaced by quartz mineralized with pyrite and carrying gold and silver values, and similar in every way to the *Belmont-Surf Inlet* showings.

The work consists of a tunnel on the vein and some surface strippings. The vein is exposed on the left side of the creek above the cabin and has been open-cut with a few shots, exposing at this place about 10 feet of vein width. Three feet on the hanging-wall is banded quartz and gneissoid granite; then 2 feet of quartz; then 3 feet of gneissoid granite; then 2 feet of quartz to the foot-wall. The tunnel was started below this surface showing and follows the vein all the way to the face, a distance of about 300 feet. The first 150 feet exposes a small vein, up to 2 feet wide, of pyritized quartz. At this point the tunnel has been turned to the left and continued on a vein on the hanging-wall for the balance of the distance to the face,

the last 60 feet running from 4 to 5 feet in width. The face now shows a width of 3½ feet of well-pyritized quartz, which, judging by the *Belmont-Surf Inlet* ore, should be of good milling grade.

Altogether it is a very promising showing and will no doubt be further explored. Should sufficient milling-ore be opened up there will be no serious difficulties in putting in a tramway from the lake to the mouth of the tunnel. Mr. Wells has done good work under difficult conditions.

There has been considerable prospecting done on Princess Royal island this year and a number of claims staked on the north end in from Rivers bight. There was no one on the ground at the time of my trip, consequently I did not get over the showings; however, I am informed that the veins are the typical pyritized quartz ones of other parts of the island, and as yet are not sufficiently opened up to form any conclusive opinion as to their value.

Whale Channel Mines, Ltd.

This company was incorporated January, 1920, under a capitalization of 200,000 shares at $1 a share. The office is at 330 Homer Street, Vancouver. Its holdings consist of the three mineral claims—*Moose*, *Moose 2*, and *Moose 3*—situated on the north-western end of Princess Royal island just south of Rivers bight. The camp is on the beach about 200 yards below a small bay which is fair anchorage in good weather.

The showings start at about 425 feet elevation above the camp, from which there is a foot-trail about a mile in length. The first or lowest exposure shows a quartz vein about 8 feet in width, lying in a brownish schistose rock with some hornblende-schist, slightly intermixed with quartz on the walls of the vein. The vein strikes N. 70° E. and dips flatly to the north at about 40°. A tunnel has been driven at this point, crossing the vein at a small angle for 25 feet, then turning to the right for a further distance of 45 feet to the face, leaving the vein about 18 feet back from the face. This work shows the vein here to consist of barren quartz. About 200 feet farther up the hill, at 500 feet elevation, a shaft has been sunk on the vein, which, though full of water, I judge from the amount of material on the dump to be 12 or 14 feet deep. Some sorted quartz shows traces of chalcopyrite and a little pyrite in small veinlets on the fracture-seams. Both the tunnel and the shaft are evidently old workings. Farther along on the vein two open-cuts have been put in this summer showing the quartz to be more broken up, and, apparently as a result of this fracturing, the mineralization is better, but of low average copper content. The upper of these cuts discloses the vein 8 feet wide and shows it fairly well mineralized, but badly broken and distorted. The upper end of the cut shows the vein to be broken up into a number of stringers tailing out to nothing in the country-rock. No work has been done above this to prove what happens. The country-rock at the upper showings appears to be more of a fine gneissoid granite, due to intense crushing and shearing action, rather than the schists showing below.

What work has been done would indicate that where the vein has been crushed there has been an infiltration of mineral-bearing solutions and deposition of iron and copper sulphides in the cracks. Not enough of the vein has been opened up to conclude whether the ore-shoots are extensive or valuable enough to work. The claims are well timbered and favourably located for working.

Great West.

This claim is owned by W. Warner and is situated on the east side of Banks island, about 8 or 10 miles from the north end and opposite the anchorage on McAuley island. It is located at the head of a small bay which can be picked up by running close inshore. Warner's camp is on the right-hand side near the head of the bay, from which there is a trail across to the showings, or by landing at the head of the bay and following up the creek the workings can be found.

The showing on the claim is a small quartz vein about a foot in width, in which occur bunches of clean chalcopyrite. The vein lies in a small dioritic dyke cutting across a belt of gneissoid granite. Both the dyke and contained vein appear to be cut off or faulted by the granite at the top of the cut. Three or four cuts have been driven on the vein, opening it up for a length of 50 feet and, as stated, exposing some bunches of chalcopyrite, but I think it too small and tight in the surrounding formation to become of much importance.

Payroll Claims.

These are two in number—*Payroll* and *Payroll No. 2*—owned by James Hickey, of Prince Rupert, and partner. They (the claims) are situated at the head of Kiltuish or Long inlet, which is about 3 miles in length, with a fine

anchorage at the head. Care must be taken in going through the entrance. The inlet is on the south side of Gardner canal, opposite Low point, about 15 miles south of Verney passage.

The rock formation in which the vein lies is hornblende-schist, probably enclosed in the granite, as the rock float in the creek and slides is mainly granite. The showing is on the beach just above high tide and consists of a quartz vein about 6 feet wide where exposed, heavily mineralized with pyrrhotite, and a little chalcopyrite disseminated throughout the quartz and iron sulphides. The ore is low grade, about 1 per cent. copper, with only traces of gold and silver; however, I think the showing worth some work to get a few feet into it. It was only staked this summer and a couple of shots put in at the beach. Its location is so favourable that a comparatively low-grade ore would pay to work.

Up the hill at an elevation of 500 feet, and also in the schist formation, the owners have dug into the soft decomposed schists and disclosed a width of from 10 to 15 feet of graphite. It occurs in widths from 1 inch to 2 feet interstratified in the schists. If there is any market for such material this is surely easy of access, and conditions for extracting and loading are ideal.

Drum Lummon Mines, Ltd.

This company has its registered office at 1115 Dominion Building, Vancouver. The property, situated on Drum Lummon bay, 26 miles above Hartley bay, on the west side of Douglas channel, has been working steadily all season with a small crew of men. The property was reported on in 1919 Minister of Mines' Report. This year's work consists of driving the main drift, extending a raise towards the surface, some crosscutting, and the stoping of about 1,000 tons of ore. The main drift was extended about 170 feet, making a total of nearly 600 feet, the vein showing all the way, except in the last 100 feet, which followed the acidic dyke along which the vein has been made. The last 60 or 70 feet of the vein, to the pinch, showed good ore and about 1,000 tons was stoped from here. The barren quartz was sorted out as well as possible and the balance put through the mill, producing 37 tons of concentrates, yielding $620 in gold, $543 in silver, and $6,930 in copper. (Manager's statement.)

The milling process consists in crushing as finely as possible, about ¾ inch, in a small jaw-crusher; the crushed ore then passes over two sets of screens; the oversize from the first screen goes to a bull-jig, which makes a shipping concentrate and tailings. The undersize from the first screen passes to the second screen, from which the oversize goes to a fine jig and the undersize to a finer jig, each making a clean concentrate and tailings. The slimes are treated in a K. & K. flotation-cell. All jig tailings are impounded for future treatment.

The vein matrix is peculiar in that it is segregated into masses of quartz and feldspar with mica bordering these masses next to the granite walls. The best ore lies interlaminated with the mica and disseminated in the quartz and mica along the walls of the vein, though masses of pure bornite occur embedded in the quartz and feldspar. In mining, the barren quartz and feldspar can be taken down from the centre of the vein and the bordering ore broken out later, furnishing a good-grade mill-feed. Some fine gold nuggets are obtained on the jig screens. Mr. Thom has been in charge at the property this season.

Bald Mountain Group.

This group, on Porcher island, was fully reported on in the Minister of Mines' Report of 1916, since which time only assessment-work has been done. Briefly, the claims cover a shear-zone about 1,000 feet wide, lying between massive granite on the south and a wide quartz porphyry or pegmatite dyke on the north. Within this gneissoid-granite zone are lenticular segregations of hornblende-schist, with garnetite, epidote, etc., sparingly mineralized with chalcopyrite. Numerous open-cuts have been put in on these lenses, but none of them have been proven of any continuity. Diamond-drilling has been suggested as a means of exploring the ground, but in my opinion the surface showings, as yet, do not warrant the amount of diamond-drilling it would require to prove or disprove the existence of commercial ore-shoots in such a width of possible mineralization.

Porcher Island.

Patterson Group.

This group is situated on the north-western corner of Porcher island and was described in the 1919 Report. This year a very creditable amount of work has been done on the property by Percy Sharpe, who has had it under some sort of option. More open-cutting has been done on the main showing and a considerable tonnage of ore put on the dump for sorting or treatment. The vein is exposed for mining for a length of about 80 feet. I am informed that about 17 tons of ore was sorted out and shipped this season, giving returns of 50 oz. gold and 30 oz. silver.

Besides the mining-work a lot of construction has been done. A small ore-bunker was built just below the level of the lowest cut, the intention evidently being to start taking out ore from that level. From this a tramway 300 feet long was then constructed to carry the ore from the bunker to an arrastra being built to grind the ore. Power will be obtained by an overshot water-wheel, to which the water is carried from a ditch by a flume about 50 feet long. A ditch has been dug around the side-hill for over 1,000 feet to carry water from a small creek draining a considerable area on the east side of the mountain. Mr. Sharpe is deserving of success in his scheme for concentration for the amount of work he has accomplished in one season. This is a promising small property.

Eagle Claim.—The owner, Joe Dawson, has worked on the property all summer, but in his absence I was unable to examine it.

There are good reasons to believe that some of these small quartz veins on Porcher island will prove worth working, and I think that this area warrants close prospecting.

Ecstall River.

The Granby Consolidated Mining, Smelting, and Power Company has had a bond on the pyrites property of the British Columbia Pyrites Company on Ecstall river for the past two years, during which time several thousand feet of diamond-drilling has been done. No information is available as to the results obtained from this work, but the bond was thrown up this summer. The property has again been bonded to Charles Banks and associates, who have been operating this year in the Salmon River country. A number of additional claims have been staked in that vicinity by the bonders.

GRAND TRUNK PACIFIC SECTION.

There has been very little mining activity this year along the railroad and very little investigation by field engineers, for the reason that no inducement is offered in freight rates for opening up anything but high-grade ore. The freight on copper ore of $125 a ton values from Pacific, a point 119 miles east of Prince Rupert, to Anyox is $10.40 a ton in car-lots. On a lead ore of $25 a ton values the rate from Pacific to Tacoma is $5.40 a ton, and on a sliding scale up to $100 a ton values, on which the freight is $7.80 a ton.

Several claims were staked by Phil. Chesley and Doc. Stanwood on the opposite side of the Skeena river from Salvus. These cover a large area of granite in which there is a small percentage of graphite. If it should prove of concentrating grade there is evidently an immense tonnage available.

LAKELSE VALLEY (THORNHILL MOUNTAIN) SECTION.

This year's mining consisted of assessment-work on several groups of claims. On the *Ptarmigan* group the Michaud Bros. obtained some very fine samples of molybdenum. I did not have time to examine this or the *Society Girl* group, on which the owners, Bell & Mason, did some work.

Lucky Seven Group.

This group of claims is owned by Oleson & Dahl. Since reporting on these claims in 1918 no work has been done on any of them except the *Diamond*. At an elevation of 3,700 feet there is a vein of quartz varying from a seam up to 12 inches in width, lying very flat in a belt of dioritic-looking rock, from which the owners have taken out with mortar and pan between $3,000 and $4,000 from two or three small pockets. Considerable work has been done at this showing this year; an open-cut 75 feet long has been faced up for from 10 to 20 feet high along the vein and a tunnel started to drift in on the dip of the vein. The quartz itself carries a little free gold, but the main values are obtained from the oxidized seams and vugs. Sparing amounts of iron sulphides and galena are found in the quartz and considerable siderite is found in the decomposed portions. Heretofore it has been necessary to remove all the rock above the vein to the surface, but sufficient depth has now been obtained to allow them to drive a tunnel on the vein, which work may prove the gold content of all the quartz sufficient to pay. The property is worth investigating, for there are a number of veins that might be developed to produce enough tonnage to feed a small, centrally located milling plant.

Since writing the above I have learned that one of the partners, Andrew Oleson, has died of typhoid fever. He was a quiet, intelligent, hard-working "old-time" prospector in this section and will be missed.

Iron Hat. This claim was also owned by A. Oleson. The tunnel has been driven on the vein a further distance of 10 feet this summer and is now in 70 feet. The face shows about 3 feet of mixed quartz and country-rock fairly well mineralized with iron sulphides, which carry gold values up to 2 or 3 oz. to the ton, and when roasted pan free gold. The tunnel looks as if it were getting into the ore-shoot exposed on the surface by two or three open-cuts. Should the ore-shoot develop sufficient tonnage a small concentrating plant might pay. There is enough water in a small creek just below the tunnel to furnish power and milling-water for three or four months in the year.

Golden Penny. This claim is owned by Ernest Hault and adjoins the *Iron Hat* claim on the north. A tunnel has been driven 36 feet, following a quartz vein about a foot wide in a schistose country-rock. It is a similar occurrence to that on the *Iron Hat*, but not as well mineralized, and shows a little chalcopyrite in places. It is worth some more prospecting.

Kitsumgallum Valley Section.

This section has had an appreciable increase in mining activity this year. Several prospects have been developed by the owners and a number of new prospectors have been going over the country. Though the wagon-road from Terrace to Kitsumgallum lake is badly in need of repairs in places, supplies can be taken in by wagon to the lower end of the lake. From the lake it is only a matter of slashing out prospectors' trails up the different creeks flowing into it to make a big area accessible for prospecting. This year such a trail was built up Nelson creek by Cliff Baldwin and partner a distance of 13 miles, opening up that creek for exploration. This is the sort of work necessary all over this district and deserves encouragement.

Treadwell No. 2.—This group, situated on the east side of Kitsumgallum lake, has been worked all summer by the owners, Joe Belway, McLaren, and partners. Nothing important is reported.

Motherlode Group. There are three claims in this group—*Motherlode*, owned by Oscar Gendron; *New York*, owned by Jack Couture; and the *B.C.*, owned jointly by Gendron & Couture, of Terrace. I understand that Oscar Olander and Paul Brodine have acquired an interest in the claims for work performed. The claims are located at the head of the South fork of Falls creek and about 5 miles by trail from Kitsumgallum lake. A good pack-horse trail has been built by the owners of this and the *Bear* group. A good cabin had just been finished on August 9th at an elevation of 5,200 feet, for which the logs were hauled about a mile.

The rock-slide just above the cabin is covered with float consisting of slaty-looking rock, in which are bands of quartz mineralized with zinc-blende, galena, chalcopyrite, grey-copper, with an occasional flake of native silver. The vein had not been definitely located in the bluffs above at the time of examination, and it was the intention of the owners to start a tunnel near the head of the slide and crosscut into the hill. The quality and quantity of the float-ore give every reason to believe that there is a good width of mineralization of at least milling-grade ore, with a good chance of finding plenty of ore that can be sorted to a shipping grade. Because of the elevation the working season is very short, about three months from snow to snow. It is a very interesting-looking property and the owners are deserving of credit for the aggressive manner in which they have gone at it under difficult conditions.

Later information is that the tunnel was driven about 40 feet, the last 20 feet showing stringers of ore through the country-rock. The owners claim to have found a width of mineralization of from 30 to 50 feet on the surface, and that the tunnel must be continued to get under the best-looking portion of the zone.

Bear Group. This group consists of four claims—*Bear*, *Hawk*, *Whistler*, and *Goat*—owned by Mat Allard, of Terrace; D. Wilson and P. Chesley, of Salvus; and G. F. Moncton, respectively, and situated at the head of Falls creek and about 5 miles from the lake. There is a good pack-horse trail from the lake to the property, built by the owners of this and the *Motherlode* group.

The prevailing country-rock is a schistose slaty rock, striking N. 10° E. and dipping easterly. The work has been done on the *Bear* claim and consists of a shaft and a number of open-cuts exposing for a distance of 600 or 700 feet a bedded quartz vein up to 4 feet in width, mineralized with iron pyrites and galena. A shaft has been sunk about 12 feet from the bottom of an

open-cut, exposing about a 20-foot face on the vein, showing a foot of solid ore, mostly galena. Free gold can be panned all along the vein where broken into, the honeycombed, disintegrated quartz panning very high in fine gold, due no doubt to the weathering-out of the iron sulphides. A depth of probably 60 feet could be obtained by drifting on the vein from the lowest open-cut, at the shaft, to underneath the highest point, which is at an elevation of 4,700 feet.

There are other parallel veins on the claims, but this is the only one on which any work has been done. With a small concentrating plant on Falls creek, about 600 feet below the croppings, where there is plenty of water-power and accessible to the lake, the vein, though small, might be profitably worked.

Sunlight Group.

There are two claims in this group—*Marmot* and *Sunlight*—owned by A. Egan and A. McKinnon, of Terrace. The claims are located at the head of Falls creek, on the opposite side of the valley from the *Bear* group. A trail was built last summer to the foot of the hill below the claims, branching from the *Bear* group trail and following up Falls creek. A. Egan has been working on the claims all summer and has done a very creditable amount of prospecting.

The rock formation is a banded slate striking N. 80° E. and dipping about 30° N. The vein is quartz varying in width from a seam on the west end, where the tunnel is started, to 12 feet on top of the cropping, and conforms in strike and dip with the country-rock. The tunnel was started on the steep face of a gulch cutting the vein on the west end; an open-cut 12 feet long was driven and continued a further 14 feet underground. All this work shows the vein to have pinched to a seam of black gouge, but, judging from the surface, the tunnel should in about 20 feet cut under a point on the vein on the surface where it crops 12 feet wide. The tunnel is at 3,800 feet elevation or about 3,400 feet above Kitsumgallum lake. Farther east a shaft has been sunk 17 feet on the dip of the vein, showing the quartz to be sparingly mineralized with iron pyrites and traces of chalcopyrite, with a few inches on the hanging-wall fairly well mineralized with zinc-blende and galena, assaying 40 per cent. lead, 20 oz. in silver, $2 in gold, and 3 per cent. copper. The vein is exposed for several hundred feet on the surface, but has not been broken into. Although the mineralization in the quartz is rather sparse and the values low, I think the size and strength of the vein sufficient to justify the continuation of the tunnel to the quartz.

Assessment-work has been done on the *Blue Grouse* and *Hunter* groups, about 6 miles up Cedar river from the crossing of the Telegraph trail. A good trail has been built from the crossing to these groups by the owners with Department of Mines' assistance. Very little prospecting has been done along the eastern side of Cedar river; in fact, the whole country in the vicinity of Kitsumgallum lake is well worth the prospectors' attention.

QUEEN CHARLOTTE MINING DIVISION.

The mining situation has not materially changed since reported last year. The old reliable shipper, the *Ikeda*, closed down early in the summer until such time as capital can be raised to develop the numerous showings on other parts on the property and equip it with a concentrator. Some little prospecting and development has been done on the west coast of Moresby island in Kootenay harbour.

The usual bunch of oil locations have been filed on Graham island. Last year about thirty oil locations on the east coast of Graham island, from Skidegate inlet north to Lawn hill, were acquired by W. A. Lewthwaite and Andrew Wright, of Victoria. The ground was thoroughly examined by their "oil expert," Henry Jory, and announcement made that drilling would commence as soon as a rig could be put on the ground, and that at least $150,000 would be spent on drilling. A hole about 30 feet deep was drilled on the beach, but the hole was not "brought in" in that depth and operations ceased.

Investigations are under way by people interested in oilfields elsewhere of the shales in the central portion of Graham island. A considerable area has been taken over by them and tests are being made of the oil content of the shales. This work has resulted in the staking of all the country surrounding the original group and about a hundred claims have been recorded. I would consider it a very doubtful investment for any one, outside of those directly interested in the industry, to put money into oil-shale lands at the present stage of the oil-shale industry on this continent. A plant to handle 1,000 tons a day would cost from $1,500 to $2,000 a ton, and judging from the yield of Scotch shales, about 24 imperial gallons a ton of shale, the contents

of the Graham Island shales would have to be appreciably greater. There is, however, a good chance of some drilling being done for oil.

Interest is again being shown in the coal-showings on Graham island.

In connection with the much-talked-of establishment of a steel industry on the Pacific coast, the magnetite-iron deposits on the mainland and the more northerly Coast islands of this district have been examined this year. There are extensive surface showings of magnetite on Moresby, Lyell, Louise, Porcher, and other islands indicative of immense possible tonnage, but as yet no exploratory work has been done by way of drilling or otherwise to prove any definite quantity of this iron ore. The discovery of appreciable bodies of hæmatite or limonite near tide-water would be of the greatest importance to the steel industry. The limonite-deposits on the Zymoetz river about 40 miles from Terrace are worth investigating. Nothing has been done beyond digging a few trenches to prove the extent of these deposits.

Graham Island Section.

South Easter Mining Co.

This property has had a couple of men employed on surface work during the summer, but there is no intimation of resuming work on a large scale. Judging from the nature of the ore on the surface and which extended to a depth of 50 feet, it is reasonable to suppose that other similar lenses of ore will be found in the veins below or beyond the present soft and broken vein-filling. The property was described in the report of 1918.

Moresby Island Section.

Blue Mule Group.

This group is comprised of three mineral claims—*Blue Mule*, owned by J. H. Jones, of Skidegate; *Paystreak No. 1*, owned by E. P. Wiggs, of Queen Charlotte; and *Paystreak No. 2*, owned by George McRae, of Skidegate. The claims were staked last fall and have been grouped for assessment and sale purposes. They are situated on the west coast of Moresby island, on the South arm of Kootenay harbour. This is a fine, landlocked, deep-water harbour, affording anchorage for any sized vessel, and is about 30 miles south of the western entrance to Skidegate channel. The claims are reached from Queen Charlotte, a port of call for the Grand Trunk Pacific boats from Vancouver and Prince Rupert. In favourable weather the trip from Queen Charlotte takes about a day each way. A good comfortable cabin has been built on the beach and a considerable amount of work done on the showings by the owners.

The lower claim of the group, the *Blue Mule*, is about half a mile from the beach. The rock formation from the beach to the foot of the hill is a belt of dark grey, bluish limestone in which are veins and stringers of pure calcite. The main mountain on which the claims are located consists essentially of a diabasic rock in which lie parallel shear-veins of brecciated country-rock and quartz more or less pyritized. The vein gangue varies from diabase, in which are numerous veinlets of quartz, to pure quartz. The values are mainly in gold contained partly in the pyrites and partly as free gold in the quartz and iron. Specks of free gold can be seen in the quartz and colours can be panned from almost anywhere along the vein.

The "lower" vein crops on the *Blue Mule* claim about 100 feet north-east of the contact between the limestone and the diabase. It strikes N. 60° E. and has been traced by open-cuts for over 100 feet. At the discovery posts, at an elevation of 125 feet, a sample was taken across the vein of about 26 inches of brecciated material, giving assay returns of $10 a ton in gold and 0.5 oz. a ton in silver. Farther west the vein pinches to about 8 inches in width.

A short distance farther up the hill another small vein crops, but no work has been done on it. Quartz knocked off the cropping where a small creek cuts it panned colours of gold.

Farther up the hill the "big vein" has been traced on the surface for 600 or 700 feet. It is easily followed by the outstanding croppings and open-cuts. At the cropping farthest west the vein is crossed by a small creek, showing it to be about 1 foot wide and consisting of banded quartz and country-rock. Pieces of quartz broken off show free gold. About 50 feet east of this point, at an elevation of 400 feet, the vein has been shot into exposing 2 feet of good-looking quartz on the foot-wall. A sample across this gave $2.40 in gold and a trace of silver to the ton. No visible gold could be detected in the sample. Just east of this cut the full width of the vein is exposed, consisting of 4 feet of quartz on the foot-wall and 3 feet on the hanging-wall of country-rock shot full of small veinlets of quartz. The vein has not been broken into here, but several pieces of quartz were broken off showing free gold. This will be a good place to obtain

a little depth by drifting on the vein. At a point 100 feet farther east along the vein a few shots have been put in, showing it to be from 2 to 3 feet in width and showing an occasional speck of gold. A grab sample from a small pile of the quartz gave only 80 cents a ton in gold and a trace of silver. Farther east about 300 feet the vein is well exposed along a perpendicular bluff, which would be a very favourable point to obtain about 200 feet depth on the vein with a comparatively short crosscut tunnel. A drift both ways on the vein for 100 feet or more would prove the average values in the vein. Still farther east the vein is cut by a creek and exposed on either bank for a height of 25 feet. It is here about 2½ feet wide of brecciated quartz and country-rock, with the quartz predominating. Beyond this the overburden is very heavy and the vein has not been exposed.

The old *Chapman* claim, now the *Paystreak No. 2* of this group, had very little work done by the original owners for the time and money spent. Some specimens of free gold were found.

There are other quartz veins on this property parallel to the above that have had no work done on them. Taking everything into consideration, I think the property one well worth investigating.

Swede Group. This is an old group of eight claims at the entrance to Klunkwoi bay. The showing consists of an immense deposit of low-grade copper ore, chalcopyrite, and bornite disseminated in diabase. Recent tests made on samples show appreciable values in platinum, which might warrant a thorough investigation of the property. All conditions for mining on a large scale are very favourable. Since the discovery of platinum and palladium values in the copper-bearing basic igneous rocks, gabbro, of Prince of Wales island, testing for such metals in similar formations in other localities should not be overlooked.

Shuttle Island.—No further development of any importance has been done on these claims and no gold produced from the beach placer claim this year.

Copper Queen Group. This group is owned by J. S. McMillan and situated overlooking Jedway harbour. Considerable work was done several years ago on the low-grade copper-showings, but only the yearly assessments have been done lately. The property was examined and sampled twice this summer, but nothing further has developed. Later the showings were examined as possible producers of magnetite-iron ore.

Campbell Island. This property is situated just outside of Jedway harbour. In the absence of the owner of the claims, W. Campbell, the only new work noticed was the sinking of the shaft a few feet. It was full of water, but judging by the dump the ore is chalcopyrite and a hornblende gangue. The chalcopyrite does not appear to be in sufficient quantity to admit of sorting to a shipping product. The island is low and heavily overburdened.

Producer Group. This group has been under bond and development for the past two years to Seattle interests, who ran a crosscut tunnel 375 feet to the vein and drifted both ways on it. Some bunches of fair-grade copper ore were found, but on the whole the work did not prove sufficiently encouraging to continue work. The claims have reverted to the owners, Thompson & McKinnon, of Jedway. There is about a foot of fair-looking ore in the face of the south drift, which drift, I think, should be continued to prove whether or not the ore-shoot showing on the surface rakes to the south. If it does the ore is still south of the present face. There is a very serviceable, small equipment of compressor, machines, and mining outfit on the property.

Ikeda Mines, Ltd. This property, which has been a consistent small shipper of copper ore for a number of years, under the management of A. Ikeda, closed down about the end of July. There was shipped this year 141 tons of ore to the Granby Consolidated Company's smelter at Anyox, yielding 27 oz. gold, 305 oz. silver, and 21,088 lb. copper, which is somewhat less than last year's output. The shipping grade of ore has been exhausted from the present workings, and Mr. Ikeda has been endeavouring to interest sufficient capital to explore several showings of low-grade ore cropping at different places on the claims, and in the event of successful results the later installation of a concentrating plant. There are several thousand tons of milling-grade ore on the old dumps. To this end capitalists from Japan, with their engineers, thoroughly investigated the property, and I am reliably informed that, with the return of financial conditions to normal, there is every probability that the property will be extensively developed. It is to be hoped that the *Ikeda* mines will be restored to the shipping class.

None of the properties on Collison bay, the *Thunder* group, *Meal Ticket* group, *Wireless* claim, or the property of the old Collison Bay Mining Company, since restaked, have had any work done on them this year.

NASS RIVER MINING DIVISION.

The area of this Division has been cut about in half; the northern portion, above a line from Mount Brown on the eastern boundary of the Portland Canal Division to the point on the eastern boundary of the Nass River Division crossed by the 56th parallel, being added to the Portland Canal Division.

The mining centres of the Division are Anyox and Alice Arm, reached by Grand Trunk and Union Steamship boats from Prince Rupert. From Alice Arm the Dolly Varden Railroad extends up the Kitsault river 18 miles; the balance of the distance to the glacier at the head of the river, about 8 miles, has a good pack-horse trail. Good foot-trails branch from the main trail up the different tributary creeks and to the more developed properties. There is a trail up the Illiance river, which flows into the head of Alice arm, for a distance of about 16 miles. From Mill bay, at the mouth of the Nass river, one can get as far as Ayansh by gas-boat, from which point there is an old trail up the Nass river to Meziadin lake. There is a trail along the Dominion Telegraph Line from Kitsumgallum lake to Ayansh, and from there through to Alice Arm, on the Eastern Contact Belt all the way.

The optimistic view expressed last year on the mining outlook has been verified this year not only by the actual production, but by the progress made in the exploration and development of a number of very promising prospects to the stage where they give every promise of becoming shipping properties in the near future.

Though this Division is probably the smallest in area, yet it is the greatest mineral-producing Division in the Province; this year's output from the two mines, the *Granby* and the *Dolly Varden*, aggregated about $5,646,900, of which the *Granby* is responsible for a little over $4,856,274 outside of the by-products from the coke plant. I see every reason to predict the steady growth of the mining industry in this Division. The present shippers may be expected to approximate their present rate of production, a number of the properties now under development should become shippers, and last, but not least, there is a good class of prospectors in the country. The increase in the amount of work done by prospectors in excess of requirements for assessments has been very apparent. The activities of the "claim-stakers" (not to be confused with "prospectors") is evidenced by the fact that over 1,100 claims were recorded at the Mining Recorder's Office at Anyox this year; of this number the majority will be restaked by the same men next year.

OBSERVATORY INLET SECTION.

This takes in the country from the mouth of Portland inlet to the head of Observatory inlet at Anyox and is practically all in the Coast Range granites.

Golskeish Mines, Ltd.

This company is capitalized for 50,000 shares of $1 a share, with its registered office at 602–605 Pacific Building, Vancouver. Its holdings consist of four mineral claims—*Golskeish No. 1*, *Golskeish No. 2*, *Silver Cup Fraction*, and *Silver Cup Fraction No. 4*—situated on Deep bay, 4 miles below Anyox. The mine, under the management of H. Heidman, has produced this year 3,454 tons of ore, yielding 475 oz. gold and 1,960 oz. silver. The ore, which is a slightly pyritized quartz, assaying between 88 to 92 per cent. of silica and a small percentage of alumina, is sold as flux at a minimum fixed rate to the Granby Company; any value in excess of the rate is received by the company. The ore is delivered by scows handled both ways by the Granby Company.

The vein is quartz, averaging about 6 feet in width and lying in a country-rock of argillite. About 3,000 tons has been mined from an open-cut about 450 long and from 20 to 25 feet deep. This cut shows the vein to be very regular in width, strike, and dip. Last winter a crosscut tunnel was driven from a point at a convenient loading-height above tide-water, a distance of 226 feet to the vein, obtaining a depth on the vein of about 90 feet, and drifts then run both ways. At the time of my examination (October 31st) the north drift had been driven 100 feet and the south drift 30 feet from the tunnel. Ore-chutes were being put in and preparations made for stoping about 100 tons a day. The vein at this depth is very uniform in every way and when opened up can be mined and shipped very economically. It strikes N. 10° E. and dips 55° E. into the hill.

Some very fine specimens of free gold have been found in small bunches and stringers of galena. As stated, the quartz is slightly mineralized with pyrrhotite carrying average gold and silver values of about $4.50 a ton. Judging from other quartz veins in this vicinity, small pockets of higher-grade ore may be expected.

A small gas-driven compressor plant has been installed on the beach at the mouth of the tunnel with a blacksmith-shop in the same building, and the mine has been well equipped with machines, steel, cars, etc. Good camp buildings have been erected on the beach, accommodating fourteen men at the time of my examination. Altogether it is a well-operated, profitable little property, due to the management of Mr. Heidman.

Granby Consolidated M.S. & P. Co.

This company has been operating continuously throughout the year, employing an average of 1,277 men, as follows: Mining, 368; smelting, 285; coke plant, 131; housings, 140; and service departments, 353. There has been a very substantial increase in the tonnage mined and smelted from the company's *Hidden Creek* mine and a consequent increase in metals production. The *Hidden Creek* ore mined and smelted totalled 802,667 dry tons, yielding 7,615 oz. gold, 381,742 oz. silver, and 25,404,950 lb. copper. In addition to this, the quartz mined at Granby point and used for fluxing purposes amounted to 17,786 tons, yielding 58,064 oz. silver and 1,715 oz. gold, or over $5 a ton. The total production was therefore 820,453 tons smelted, yielding 9,330 oz. gold, 439,806 oz. silver, and 25,404,950 lb. copper, an increase over last year of 172,987 tons of ore smelted, 4,466 oz. gold, 91,398 oz. silver, and 5,860,362 lb. copper. The disproportionate increase in gold and silver to the increase in tonnage is due partially to the values in the fluxing-quartz, and the balance would indicate an increase in those values in the *Hidden Creek* ore smelted. The company also mined 18,000 tons of fluxing-quartz from the *Rambler* claim, but as it carried no values is not included in the above tonnage. The quarries at Swamp point, on Portland canal, produced 47,189 tons of limestone for flux.

The 100-ton "pilot" concentrator ran steadily up to the end of November on experimental work under the superintendency of P. E. Peterson. I understand that tests made with the flotation-cells designed by Mr. Peterson have proven very satisfactory in the differential flotation of the low-grade copper-iron sulphide ores.

The coke and by-products plant converted 146,000 short tons of coal, mainly from the company's coal-mines at Cassidy, on Vancouver island, producing 77,290 short tons of coke, 5,986 short tons of breeze (fine coke), 757,057 imperial gallons of tar, 2,465,955 lb. sulphate ammonia, 1,203,954 cubic feet gas, and 121,734 imperial gallons refined benzol.

During the last two months of the year the weakness of the copper market necessitated the curtailment of operations and threatened the complete close-down of the plant; however, the situation was thoroughly discussed by the management with the employees, who voted to accept a reduction of wages and the continuation of operation. The general management of the property is now under H. S. Munroe with E. E. Campbell as assistant manager.

Hastings Arm Section.

There are several properties up from the head of Hastings arm on which the owners have been working for several seasons. I have not had the time to get into this section, but I am informed that there are some good-looking prospects and that the trail is badly in need of repair. There is no reason why it should not be as good a prospecting country beyond the granite-contact as is the Kitsault river.

Alice Arm Section.

There are no properties of any note on the arm, but good reports are heard of the showings on Roundy and Lime creeks, which flow into the east side 3 or 4 miles from the head. I expect to get over these areas early in the spring as soon as the snow is gone.

Kitsault River Section.

Owing to the lateness of the season when I was able to get into this section, the snow was already on the higher ground and I was therefore unable to examine any properties of high elevation. This section includes the Kitsault River valley and tributary valleys from the head of Alice arm to the head of the Kitsault river, about 26 miles. The Dolly Varden Railroad is in operation from the beach to the mine, 18 miles up the river, from which point the Government trail extends to the glacier, a further 8 miles. Branch trails have been built up the East fork,

Paul Kladuc creek, to the *La Rose* workings, Trout creek to the *Last Chance*, to the *Vanguard* group, and from there to the *Matilda* and *Fox* claims.

The section has had an extraordinarily active season and an immense amount of exploratory and development work has been done. The *Dolly Varden* has made a wonderful production and probably a dozen other properties are in a fair way of becoming important producers. The prospectors have done a large amount of work on their claims and many new prospects have been staked. The "claim-staker" has been exceptionally busy in this section, and next year will no doubt be a "claim-restaker" to the exclusion of the worth-while prospectors.

This section represents a small area in the Eastern Contact Belt and is proving wonderfully rich in silver ores. No doubt there are other portions of this belt equally as well mineralized, and being several hundred miles in length it has scarcely been touched as yet. The reader is referred to last year's report on this section.

Black Bear or Esperanza Group.

This group has three claims—*Black Bear*, *Aldebaren*, and *I Chance It*—and was formerly known as the *Roundy* property. It has been a small shipper of high-grade silver ore for several years. Pedro Salinas, one of the owners, this year mined and shipped 18 tons of ore that gave returns of 3.4 oz. gold and 3,788 oz. silver. This is a property which, if prospected and developed on a larger scale, might show some valuable ore-shoots. Toronto interests were negotiating for it, but I am not informed whether it was bonded or not.

Alice Arm La Rose Mining Co.

This company was organized early in the year and took over the *La Rose* group, on Paul Kladuc creek, from the owners, Miles Donald and partners. It has been a small shipper for several years, producing high-grade silver values in grey-copper and silver sulphides. The company is capitalized for 1,000,000 shares at $1 a share, with its head office at the office of E. H. Mortimer, Prince Rupert. Some work was done this summer by the new company under the supervision of Miles Donald. The old shaft, from which former shipments were mined, was retimbered and put in shape to continue sinking. A crosscut tunnel was driven 42 feet to the "big quartz vein" cropping on the surface, striking N. 80° E. and dipping north about 60°. This tunnel had just struck the vein when work was closed down for the winter. Small values in silver, 2.2 oz. to the ton, were found, with traces of chalcopyrite and galena, which is encouraging as none of the croppings showed values.

Central Group.—This group of three claims, owned by MacFarlane & Kennedy, of Alice Arm, was fully described in last year's report. This year's work consists in the extension of the upper tunnel for assessment-work. Nothing new has been reported.

Ruby Group.

Work was continued on the property this year by J. C. Smith, of Seattle, Wash., to whom it is under bond. Unfortunately, work had stopped and Mr. Smith had left the camp when I made my trip this fall; consequently I did not get over the property again.

Toric Group.

This group, owned by John and Gust Strombeck, of Alice Arm, was bonded early in the spring, but apparently no arrangement for work was made in the agreement, as nothing was done until the bond expired in the fall. Some further work was then done by the owners by way of open-cutting in tracing the vein up the hill, and I am informed by them that ore showing native silver was found. It has the ear-marks of a valuable property.

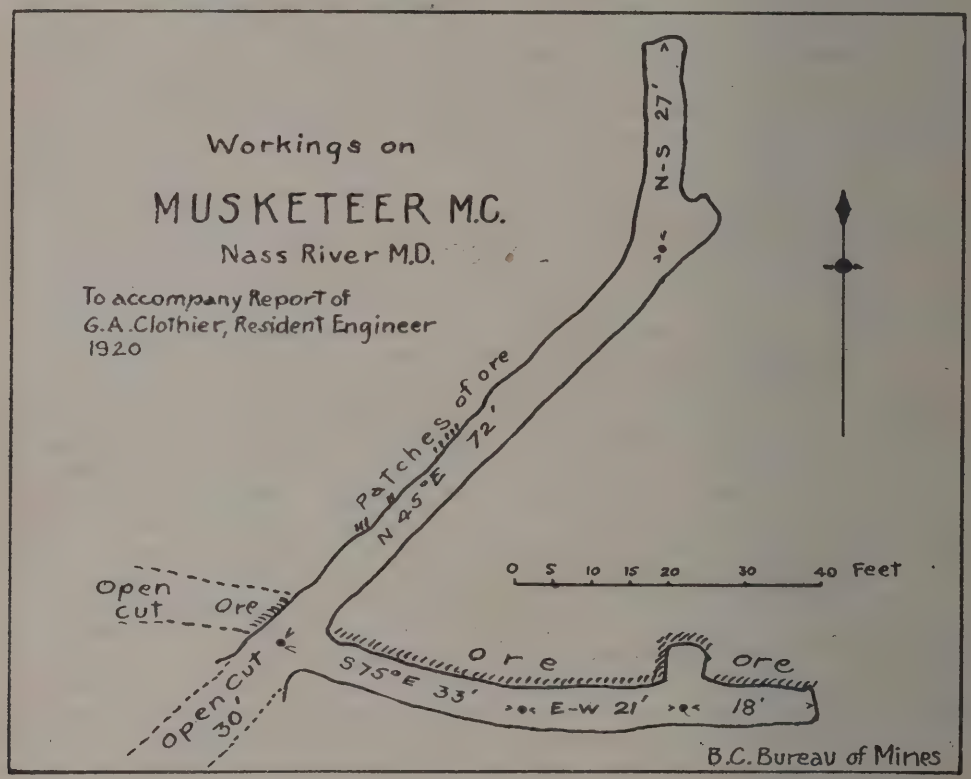
Tiger Group.

This group is composed of two claims—*Tiger* and *Lion*—owned by Ed. Pickett, of Alice Arm. The property was under bond to H. B. Price, of Victoria, and considerable exploratory work done and diamond-drilling and tunnelling. The owner being absent on account of ill-health, I was disappointed in not being able to examine the property since the above work was done. He, however, seems in no way discouraged as to the merits of the property and will continue development next year.

Musketeer Group.

This property has been purchased by A. D. Meenach, of Seattle, Wash., from the locators and owners, Al. Miner, Miles Donald, *et al.*, of Alice Arm. There are five claims in the group—*Athos*, *Porthos*, *D'Artagnan*, *D'Artagnan No. 1*, and *Armes*. The property was reported on in the Minister of Mines' Report for 1919, since which time about 200 feet of work has been done in tunnelling and an open-cut. The work is started about 25 feet above the railroad-grade and driven 30 feet as an open-cut,

reaching the ore disclosed in the old lower cut. From this point the tunnel was driven along the wall of the vein on a bearing of S. 75° E. for 33 feet, where it turns 15° to a bearing of east for a further distance of 39 feet to the face. A crosscut was driven 7 feet across the vein at a point 18 feet back from the face. No samples were taken, but the ore, quartz mineralized with iron and sprinkling of galena, I judge to be of milling grade. Mr. Meenach claims to have obtained high-grade silver values in samples from this prospect. This work proves a strong, well-defined vein for a length of 64 feet, a very encouraging showing for the amount of work done. Good depth will be obtained on the vein by the continuation of this tunnel.



From the mouth of the tunnel (*see* sketch) a crosscut tunnel was driven 72 feet on a bearing of N. 45° E., turning at that point to a north-south bearing for a further distance of 27 feet. Ore shows in the back and upper portion of the crosscut in spots for some distance from the vein at the mouth of the tunnel, but beyond that to the face and in the north portion of the tunnel no ore was encountered. This is one of the promising properties of this section.

Wolf Group. This group, situated north of and adjoining the *Musketeer* group, is part of the holdings of the Dolly Varden Mines Company, now operated by the Taylor Engineering Company. The Dolly Varden Railroad has been partially graded between this and the *Dolly Varden* mine and will eventually be completed through. The power plant of the company has been installed on the *Wolf* this year and an extensive programme of development has been outlined for this winter. The only work done on these claims is a tunnel 35 feet long driven in on the vein and crosscuts both ways from it across the full width of the vein, which is shown to be about 60 feet. Several thousand feet of diamond-drilling was done by the old company, satisfying them that there is an immense tonnage available of milling-grade ore. This, and very probably the ore-bodies that will be opened up from now on in the *Dolly Varden*, will necessitate the addition of a concentrator suitably located to handle the outputs of both mines.

Hyder, Alaska, at Mouth of Salmon River, Portland Canal M.D.

Stewart, B.C., from Hyder, Alaska.

Climax Group. This group is composed of two claims—*Climax* and *Climax No. 2*—owned by O. Besner, of Prince Rupert, and M. P. Olson, of Alice Arm, and situated on the north side of Trout creek. A trail has been built by the Government up Trout creek, serving the *Climax*, *Moose*, *Last Chance*, and other properties farther on towards Green lake. Considerable work was done last year on the property, for which reference is made to last year's report. No work except assessment has been done this year, but the development of the *Moose* group, adjoining this on the north, will have a direct bearing on the *Climax*.

Moose Group. This group consists of five claims—*Moose No. 1*, *Moose No. 2*, *Moose No. 5*, *Moose No. 6*, and *Moose Fraction*—and adjoins the *Climax* group on the north. It was staked by Don Cameron after selling the *Wolf* group to the Dolly Varden Mines, Limited, and has been bonded by him and associates this summer to Vancouver interests which have been incorporated as the Moose Group Mining Company, Limited, with a capitalization of $100,000 of 1,000 shares. The property was reported on by, and is now under the supervision of P. W. Racey, M.E., of Vancouver.

Since last year's report Cameron drove a tunnel a distance of about 35 feet to get under the best surface showing, consisting of 2 feet of high-grade ore and about 12 feet of mixed ore. The work proved rather disappointing, in that it was found the vein was broken up at that depth.

The present company had just completed two good log buildings when I was on the property, October 23rd. The bunk-house is 16 by 25 feet, and the mess-house 16 by 21 feet, with a root-house between. They had built a trail from the Trout Creek trail below the old camp to the new camp, at an elevation of 2,200 feet.

There are ten open-cuts on the claims, tracing the vein a distance of about 600 feet on the surface, within a vertical distance of about 300 feet. Development-work outlined for this winter includes a tunnel to be started about 125 feet below the camp to get under two open-cuts showing fine ore, at one place 230 oz. silver to the ton across 3 feet; another tunnel above this and midway between the lower and Cameron's tunnel; and the extension of Cameron's tunnel. Up to the end of the year about 200 feet of tunnel-work had been done and several more open-cuts put in. The No. 1 or Cameron tunnel had been extended 60 feet, making its total length about 100 feet. The later work in this tunnel is said to be opening up an exceptionally fine showing of ore, in places assaying several hundred ounces of silver to the ton and averaging around 50 oz. a ton. No. 2 tunnel has had a little work done in it. No. 3 or lower tunnel has been driven 128 feet and is exposing a shoot of commercial ore. This property has every chance of developing very quickly into a shipping mine.

Last Chance Group. There are four claims in this group, owned by Archie McPhail, George Kolbeck, and Pat Morley, of Alice Arm. The claims lie east of and adjoining the *Moose* group and are about half a mile up Trout creek from the Kitsault trail. H. B. Price, of Victoria, had the property under bond last year and up to this spring, during which time it was explored by diamond-drilling. There is a very promising surface showing about 60 feet wide which had been shot into in a few places by the owners. I am informed that horizontal drill-holes from the base of the hill proved the width and contents of the vein to be very encouraging, but down-holes to prove it at depth were very disappointing. As a result of the work the option was not exercised and the property reverted to the owners.

Columbia Group. This group consists of three claims owned by Pete Anderson and situated on the north bank of Clearwater creek. As stated in 1918 report, there is a big, well-defined quartz vein on the claims carrying little or no values where exposed. This year Pete drifted 80 feet on the vein, packing all supplies on his back from the end of steel at the *Dolly Varden* to the claims, about 8 miles. He reports that the vein exposed in this tunnel carries very little value, his highest assay going $6 a ton in gold.

Mineral Claims Development Co. This company was organized two years ago with a capitalization of 1,000,000 shares of $1 a share, with its head office at 1004 Standard Bank Building, Vancouver. Its holdings consist of the *Homestake* group at the head of the Kitsault river and described in 1918 report. Since taking over the claims this company has done practically nothing towards developing the property, though I believe the payments are being made to the owners. I judge that this kind of mining is unsatisfactory to shareholders, and it surely is not beneficial to the section in which the property is situated.

Matilda claim, owned by A. Smith, and *Fox* claim, owned by Oscar Flint, are situated above the *Homestake* group. A trail was built by the owners this summer from the *Vanguard* trail around the side-hill and some work done on the claims.

Vanguard Group.—This group is owned by Morris Petersen and the Strombeck Bros. I am informed considerable work has been done by the owners in the tunnels. I did not get to this or any of the higher properties on account of the early snow.

North Star. The Alice Arm Silver Mining Company, Limited, owns this property, which lies north of and adjoining the *Dolly Varden* and has been under development for the past two years under the supervision of James McAleenan, of Alice Arm. This year's work consisted of driving the lower tunnel a short distance, the installation of a compressor plant, and the equipment of the mine with cars, track, machines, etc. The property was idle for three or four months during the summer, but resumed work in December. It is reported that the extension of the tunnel is showing up very fine ore. It is stated by the manager that ore will be rawhided to the Dolly Varden Railroad this winter for shipment in the spring, when railroad operations are resumed.

Dolly Varden. The Mines Department of the Taylor Engineering Company, Limited, has been operating the *Dolly Varden* mine all year under the management of C. B. North. The work during the winter and early spring, until snow conditions permitted putting the railroad into commission, consisted of shipments of small tonnages of very high-grade ore, taken from the mine to the dock by dog-team and double-end sleds, and development-work. The underground work was confined mainly to driving the No. 5 tunnel a distance of 970 feet, a little beyond the face of the No. 4 level. No more development-work was done after shipments commenced, and the heavy production throughout the balance of the year from June 1st practically depleted the ore reserves in the workings above the No. 4 level.

For the last seven months, with the exception of the latter part of December, production averaged about 150 tons a day, the total output for the year being 28,037 tons, yielding 831,638 oz. silver, shipped from Alice Arm by scows to the Granby Company's smelter at Anyox. To provide for these shipments the railroad had to be practically regraded, heavier rails laid for several miles on the upper end of the line where the grades are the heaviest, and additions made to the rolling-stock. A Climax engine was put on the upper end to handle ore-cars from the mine to the foot of the heavy grade, lighter engines being used from there to the dock. With three or four Climax engines the daily capacity of the railroad could be raised to 400 or 500 tons, which would be adequate for the production of the valley for some time. More power was supplied for the mine by the addition of another small compressor, and mine equipment was furnished. The mining end was under the superintendency of J. Milligan, with underground work under the direct supervision of Dan Tatrie.

In addition to this, the future requirements of the property were anticipated in the construction of an 800-ton capacity ore-bunker at the dock, connected by a high line with the main railroad. The railroad-grade was extended about a mile beyond the mine towards its completion to the *Wolf*, and the rails laid to ore-bunkers built in preparation for the driving of No. 6 level this winter. A hydro-electric power plant of 500-k.w.h. capacity was installed on the *Wolf* property, power being obtained by diverting a portion of Trout creek to Wolf creek, from which a head of about 400 feet was obtained. The small compressors at the mine were later replaced by one large one.

An extensive programme of very necessary development-work has been outlined for the winter, and will include the driving of the new No. 6 level for 300 feet, from which point an incline raise will be put through to the No. 5 level, a distance of 450 feet; No. 5 level will be thoroughly explored and the ore-bodies above it, located by diamond-drilling, opened up for extraction of ore next summer. Several raises will be put up from No. 5 to No. 4 levels and No. 2 tunnel extended under extensive surface croppings of the vein.

While it is expected that much ore of shipping grade will be encountered, it is anticipated that eventually a concentrator will be needed for the treatment of both the *Dolly Varden* and *Wolf* ores.

Since the above was written the mine has closed down for the winter, meaning that no development-work is being done, which will probably seriously affect next summer's production.

Illiance River Section.

Reports from this section of the district are distinctly optimistic, and I regret that, owing to the lateness of the season and the consequent absence of all the propery-owners, I was unable to examine anything except the *Bellevue* group, which is being worked all winter. There are several very promising showings in this section, but it is badly handicapped in having the worst trail in British Columbia. Two years ago several thousand dollars were expended on the trail from Copper creek to the crossing, a distance of about 5 miles, which portion is in fine shape, but hard to reach from either end. The lower end, from 5-Mile down, should be relocated to follow the river-grade instead of taking to the hills. In its present condition it is fairly navigable where the mud is not too thick.

Bellevue Group.

This group consists of four claims and a fractional claim—*Bellevue*, *Bellevue No. 2*, *Bellevue No. 1*, *Snow Fraction*, and *Blenheim*—from the south up the valley in the order named. The claims were staked some years ago by John Stark as agent for Dr. W. T. Kergin and associates, of Prince Rupert. The property is now under bond to the Alice Arm Consolidated Holdings Company, Limited, with A. J. Hughes in charge at the property. The company was incorporated in Vancouver with a capitalization of $100,000 of 500 shares.

The property is situated about 13 miles from tide-water up the Illiance river, which flows in at the head of Alice arm. There is a trail along the river over which supplies are taken on horses, though it is badly in need of repairs. There is a good grade for a wagon-road from the beach, the elevation at the camp being 2,300 feet. Very little work had been done on the property previous to being acquired by this company and nothing of importance had been found. This summer good camps were erected and a lot of surface prospecting done by way of open-cuts, trenches, and stripping. A tunnel had just been started at the time of my examination to a crosscut to the vein under one of the best showings, which is exposed in an open-cut on the south end line of the *Blenheim* claim.

The prevailing rock formation at this portion of the Illiance valley is an altered, porphyritic andesite, more or less schistose and slightly pyritized throughout. In this formation are belts or zones of soft schists, probably the result of intense shearing action, which had been replaced in part by lenses, stringers, and parallel bands of quartz, mineralized with iron pyrites, zinc-blende, galena, and grey-copper, in which are gold and silver values.

The main mineralized belt on the property is from 25 to 50 feet in width and has been traced on the surface for a length of over 3,000 feet. Other small belts have been exposed, but as yet are of no importance. As stated, there are several open-cuts on the main vein, the best exposure being on the south line of the *Blenheim* claim. Here the vein has been exposed for a width of 20 feet, 3 or 4 feet on the hanging-wall being quartz exceptionally well mineralized with galena and grey-copper, which could be easily sorted to a shipping-grade ore. The balance of the vein, as far as could be seen, is heavily pyritized, with stringers of galena running through the quartz and iron sulphides, and I judge a good grade of milling-ore. I am informed that Mr. Racey's sample across 15 feet from the hanging-wall averaged $1.40 gold, 23.05 oz. silver, 3.4 per cent. lead, and 5.4 per cent. zinc. It is without doubt a very promising surface showing. Should the ore extend down to the level of the tunnel, about 100 feet vertically, and the ore-shoot prove of any length when drifted on from that level, retaining its width and values, it will make a very valuable property. The extent of and values in the surface showings certainly warrant the extensive exploration of this mineralized zone. The chances are very favourable for opening up a sufficient tonnage of milling-ore to justify the erection of a concentrator.

In the event of the property developing satisfactorily, the transportation problem to tide-water would not be a difficult one.

I have been informed that a well-mineralized, well-defined vein, evidently the same as exposed on the surface, has been encountered at 185 feet in the crosscut tunnel.

United Metals Mining Co., Ltd.—Nothing has been done on the company's claims this year, and as they were fully described in 1918 and 1919 reports there is no need of again going into details.

Silver Star Group.—(*See* 1919 report.) The owners, A. R. Hodgson and associates, of Anyox, have had two men working on the tunnel all summer, and so far as I can learn the results have been very satisfactory.

Silver Bell Group.—This property has been fully reported in the last two years' reports. The owners worked on it all summer, but I had no chance to examine the work on account of the snow.

Monarch Group.—No work has been done this year.

The claims on McGrath mountain have all had the yearly assessments done by the owners. G. W. Morley and A. Clary and partners are enthusiastic over the results of the season's work on the *Silver Band* group.

PORTLAND CANAL MINING DIVISION.

The boundaries of this Division were changed this year, taking effect on and after July 2nd, and are officially defined as "Commencing at Ramsden point, etc." (*see* 1919 report). This means that all the country around Meziadin lake, the upper basin of the Nass river, and the headwaters of the Unuk river, that formerly had Anyox for Recording Office, will now be recorded at Stewart. This, I think, is a very convenient arrangement, as all the additional area, except the Unuk River district added to the Portland Canal Division, is reached by way of Stewart, and therefore all records are now available without going to Anyox.

The area at the head of Portland canal, which has been in the mining limelight for the past two years, resulting from the wonderful development of the *Premier* mine, is reached by way of Stewart, the most northerly seaport in the Province, 120 miles from Prince Rupert, from which there is a weekly boat service. From Stewart to the head of Bear river is 26 miles, 14 miles of which is over a fair wagon-road to the forks of Bear river and American creek, from which point to the head is a first-class pack-horse trail that continues on through to Meziadin lake and beyond that to the Groundhog coalfields, a distance from Stewart of about 90 miles. In 1910 and 1911 a standard-gauge railroad was built by D. D. Mann from Stewart for 14 miles up the Bear River valley, its objective being the Goundhog and interior country by way of the Bear River pass.

From Stewart to the heads of Salmon river and Cascade creek by way of Hyder, and up the Salmon River valley, is about 26 miles. There is a good winter road to the *Premier* mine, which is yearly being improved into a wagon-road by the Alaskan and the British Columbia Governments. It is being continued from the *Premier* road on up to the head of the valley, a further distance of 7 or 8 miles, which is now served by a good pack-horse trail to the *Forty-nine* mine on the west side of the valley, and to the *Spider* mine on the east side. Prospectors going over the divide at the head of the valley to the Nass slope can have supplies packed to either the *Forty-nine* or the *Spider*. From the *Forty-nine* to the foot of the glacier over the divide is about 8 miles, and from the *Spider* over Long Lake glacier is about the same distance. Some prospecting was done on the Nass slope this year and about fifty claims staked. High-grade silver ore is reported from surface showings which is most encouraging. This route to the head of the Unuk river was tried out by a party sent out by the Mines Department this summer. The conclusions of this party were that it is too long and difficult a country for prospectors to pack supplies over on their backs. (*See* Unuk River section.)

The general mining situation of the Division is very satisfactory and will be discussed more in detail under the headings of the different sections into which the Division is divided for this report. A great number of properties were bonded last winter and companies were incorporated on them, giving quite an old-time "boom" air to these sections. However, the lack of engineers' reports on the majority of these properties put them in the "wild-cat" class, and the general public did not fall for the wonderful opportunities offered. Nevertheless, a great deal of exploratory work was done throughout the Division, resulting in disappointment in several cases, but with general results that give every reason to believe that the mining industry in this section will steadily advance from now on.

When the excessive cost of everything pertaining to mining is considered; the high prices asked for prospects in the first place; the high prices of mining labour and mining supplies of every kind; and the high cost of packing; with no chance of obtaining proportionately high prices for metals if the property does make a shipper, I think the amount of exploration and development-work done during the past two years is extraordinary. I firmly believe that there will be, from now on, better chance of obtaining prospects on reasonable terms and better conditions for developing mining properties than in the past, and consequently greater mining activity may be looked for.

The Dominion Government built a dock early in the season at Stewart, which is connected with both Stewart and Hyder (in Alaska) by a highway constructed by the Provincial Government. This dock was badly needed on account of the dangerous condition of the old one, but has proven totally inadequate for the volume of freight going into the camp and the tonnage of ore being shipped out by the Premier Gold Mining Company.

A geological survey was completed this summer by the Department of Mines at Ottawa, with Dr. Schofield in charge of the party. This work was started two years ago by J. J. O'Neill, and when published will be of great aid to prospectors and operators in that belt, as well as giving a good idea of what to expect in other portions of the Eastern Contact Belt. It is to be hoped that this Geological Survey Report, with its accompanying maps, will be available at an early date.

The only shipping property in this Division this year is the Premier Gold Mining Company, whose production is somewhat less than last year, due to winter hauling conditions. Considerably more has already been shipped this winter, and with the completion of the concentrator in the spring this property will become a steady, big producer. When the wagon-road is completed into the upper valley of the Salmon river there should be several small shippers from that area.

Portland Canal (Proper) Section.

This section takes in the canal only, from Portland inlet north to its head at Stewart, and is not to be confused with Portland Canal Division. Any part of it is easily reached by launch from Stewart or Prince Rupert. A number of claims were staked on the east side this summer (the west side is in Alaska), but no work of any account has been done on the older prospects since the 1918 report, to which the reader is referred.

Georgia River Mining Co.—(*See* 1918 report.) This company, owning the *Guggenheim* group on Georgia river, did a little work on the property this summer, but nothing new is reported.

Swamp Point.—The limestone-quarries were operated only a portion of the year by the Granby Consolidated Company.

Marmot River Section.

This includes all the area reached by way of the Marmot river, which flows into Portland canal on the east side about 4 miles south of Stewart, from which point it is reached by boat. There is a good cabin on the beach and a good horse-trail all the way up the river to the glacier, about 5½ miles, and for 3 miles up the North fork. There has been a great deal of prospecting done in this area this summer and some very fine high-grade silver ore found. It is a very accessible section, though somewhat dangerous in places from snowslides when the snow is running early in the spring.

Montana Group. This group, situated about 5 miles up from salt chuck, was under bond to the British Columbia Exploration Company, Limited, whose office is at 706 North-West Building, Vancouver. A little exploratory work was done and I understand that the bond has been extended. This is the only property in the section that has had any work of note done on it this year, and last year's report describes the other prospects.

Sterling Mining Co. This company was incorporated in March, with a capitalization of 1,000,000 shares at 25 cents a share, with its registered office at 537 Pender Street West, Vancouver. It took over the *Grandview* group, situated on the North fork of Marmot river, and consisting of four claims—*Grandview 1, Grandview 2, Grandview 3, Grandview 4*—owned by Messrs. Magee, Fraser, Gilfillan, and Cullin.

Bear River Section.

This section takes in all the Bear River valley and its tributaries, Goose, American, Bitter, and Glacier creeks. The upper portion of the valley, from Bitter creek up, was seriously handicapped for about a month in the early part of the spring by extremely high water, which did a great deal of damage to roads, trails, and bridges. The Portland Canal Short Line Railroad had been repaired by the Algunican Development Company, under arrangement with D. D. Mann, but unfortunately was put out of commission before it had been of much service. However, a greater amount of prospecting and development-work was accomplished than has been noted for some years. The wagon-road from Stewart to its terminus at American creek should be cleaned out and put in good repair, and the trail from there to the summit put in good shape,

for there will be a lot of supplies taken in next season. From the summit to Meziadin lake should be made passable for prospectors.

Bear River.

Silverado Group. There are two claims in this group, names not known, owned by the Stewart Bros. and John Haake, of Stewart. The claims were staked this summer and only a little work done on them. The vein, which lies very flat, has been traced for 300 or 400 feet on the surface and a few shots put in on it, showing from 4 to 14 inches of quartz mineralized with grey-copper. A sample assaying 5 per cent. copper gave 360 oz. a ton silver and $10 a ton gold. The showings are at an elevation of 3,500 feet, a short distance south of the big glacier across the Bear river from Stewart.

Bayview Group. This group consists of twelve or thirteen claims situated on the west side of Bear river just above the town of Stewart. The original holdings were two claims—*Bayview No. 1* and *Bayview No. 2*—owned by George Cameron and W. A. Cameron, of Stewart. Ten or eleven additional claims have since been staked by the present bonders and included in the Bayview Syndicate holdings. The additional claims are *Lucille, Kent, K.P., Tacoma, Zealander No. 1, Zealander No. 2, Zealander No. 3, Zealander No. 4, Beth, Vicky Fraction,* and *Mary.*

This year a good horse-trail has been cruised out and built by George Cameron to the camp-site on the claims, starting at a point about half a mile above the Bear River Bridge. It is 5 miles long, climbs to an elevation of 3,400 feet in that distance, and is a creditable piece of location-work and construction. A cabin was built at the bridge to serve as an office for Mr. Stamford, who is in charge of the property for the owners, as well as a storehouse for supplies going up the hill.

The rock formation from the river to the camp is granite, a spur from the main range to the south, and above or west of this, and containing the veins, is a belt of metamorphosed sedimentary rocks in contact with the main granite range on the west. There are two quartz veins on the property; the lower and smaller one lies in the contact between the granite spur and the altered sedimentaries, strikes N. 30° E., and dips 65° W. into the hill and apparently away from the granite. This vein crops only at intervals for 300 or 400 feet and has been exposed in two or three open-cuts. It varies in width from a seam of quartz up to 2 feet of parallel bands of quartz, mineralized with pyrrhotite, zinc-blende, galena, and some grey-copper. The mineralized portion, or ore-shoots, are small, short lenses; the heavier sulphides, especially the galena, where showing grey-copper, carry high values in silver. Though there has not been enough work to prove this vein in any way, it looks small and unimportant on the surface. A 100-foot crosscut tunnel was being driven by contract at an elevation of 3,700 feet to gain a depth of 80 feet under one of the croppings of the vein. I have later information to the effect that the vein, or at least any mineralization, was not located in this tunnel.

The upper vein is the important showing on the property, and, though not so advantageously situated, is the one that should have been opened up. From what can be seen on the surface, I judge it to be a shear-zone in the altered schists, in which are long lenticular bodies of quartz, sulphides of iron, lead and zinc, and country-rock. The mineralization is in places on the surface 6 feet in width, showing up to 1 foot of galena, with grey-copper, assaying as high as 300 oz. to the ton in silver, and mixed sulphides also carrying good silver values. These croppings are decidedly interesting and well worth opening up. The vein lies 600 or 700 feet west of the small vein and could be attacked by a crosscut tunnel started from a bench about 200 feet below the croppings, which are at an elevation of 4,500 feet. I would suggest extensive surface work on this big vein, in exploring the surface showings and tracing the vein both ways in order to ascertain the most favourable and likely point to attack it to obtain depth. The line of the croppings strikes about N. 30° W., or about 60° variation from the lower vein, which it may intercept going south.

Altogether this a very promising property, well located for mining, well timbered on the lower claims, available water-power, and in the event of developing into a shipper could be equipped with an aerial tramway to tide-water.

Mobile Group. (*Gibson* group.) This has had a little further work done on the showings this year. One open-cut exposes a 4-foot vein, of which 2 feet is good-looking ore and the balance oxidized material. In another small cut in the

same vein a sample across 1 foot of the best of it gave 134 oz. a ton in silver, while from another small cut below this 104 oz. a ton in silver was obtained. A drift on this vein might open up a shoot of shipping-ore. A good horse-trail could be easily built to it from the *Portland Canal* mine in about half a mile. (*See* last year's report.)

Prince John Group.—This property was reported on in 1918 and 1919. I understand that the owners did considerable work on the claims this year, but I did not get a chance to examine it.

Royal Irish Group.

The following claims are included in this group: *Boyne*, *Connacht*, *Royal Irish*, *Ulsterman*, *Leinster*, and *Munster*. They are situated along the Portland Canal Short Line Railroad, commencing about a mile north of Bitter creek and crossing Bear river to the west side at the canyon and extending through to Goose creek. They are owned by P. M. Miller, F. S. Clements, *et al*, of Prince Rupert.

The formation is a broad belt of granitic rock from 1 mile to 2 miles wide, running in a north-westerly direction, crossing Bitter creek at its mouth and extending to and up Goose creek. Within this belt is a wide vein of quartz, or probably a number of parallel veins, running with the belt and seen cropping along the railroad below the canyon and in the low bluffs on the opposite side of the canyon. Some work has been done by the owners this summer in open-cutting these croppings. The quartz exposed in all of these cuts has so far proven very low grade, one sample only assaying over $5 a ton in gold.

On account of the width of the quartz-zone, which to all appearances is several hundred feet in places, it might take an immense amount of work to obtain any conclusive information. Diamond-drilling has been suggested and appears to be about the only method of attacking it, but the apparently small general values and the lack of any concentration of minerals anywhere certainly does not recommend such an expenditure.

Aztec Group.

There are four claims in this group, as follows: *Tillamook* and *Wollaby*, owned by George Cameron, of Stewart; *Aztec*, owned by W. A. Pratt; and *Bellarophon*, owned by John Watt. They are situated on the west side of Bear river, about opposite the mouth of Bitter creek, and extend, I believe, from the river to the top of the mountain. The country-rock is greenstone, locally known as the "Bear River formation."

There are two veins on the group—the "Iron vein" and the "Copper vein." The Iron vein crops at an elevation of 2,300 feet, where an open-cut shows it to be 9 feet wide and composed of very heavily pyritized quartz, containing also a little chalcopyrite. An average sample across the vein assayed $4.80 a ton in gold, 0.8 oz. in silver to the ton, and 1.3 per cent. copper. There are 3 or 4 inches on the hanging-wall of a better grade of chalcopyrite, assaying $5.20 in gold, 1.4 oz. in silver to the ton, and 2.7 per cent. copper. The vein has again been exposed farther down the hill, showing the same heavy iron content.

The Copper vein crops higher up the hill, the gangue consisting of a breccia of quartz and greenstone country-rock, mineralized with iron and copper sulphides, with a little magnetite showing in places. The mineralization occasionally extends into the wall in small stringers of quartz for 2 or 3 feet. The first outcrop is at 2,600 feet elevation, showing a vein width of 3 feet, across which a sample assayed $1.40 in gold, 2.3 oz. in silver to the ton, and 0.3 per cent. copper. About 40 feet beyond this and higher up the mineralization is about 6 feet wide, of which about 1 foot on each side is fairly solid iron and copper sulphides, a picked sample assaying a trace of gold and 16 per cent. copper. About 150 feet farther along on the vein it is about 2½ feet wide of fairly solid sulphides, which assayed 2.2 oz. silver a ton and 3.2 per cent. copper. There are outcroppings again at 3,600 feet elevation, apparently the same vein, but not positively traced through on account of the rugged bluffs. At 3,850 feet elevation, the highest showing, an open-cut 12 feet long shows a width of 2 feet of 13-per-cent. copper ore and is the best showing so far on the vein. This is a promising-looking vein that could be easily opened up by drifting, and, together with the Iron vein, makes the property worth examination.

Ruby Silver Group.

This group has five claims situated on Mosquito creek, about 1½ miles from the junction of American creek with the Bear river. The property has been under development by Mr. LeSueur, of Victoria, during the past season, who informs me that about 90 feet of drifting has been done on a 6-foot vein and two crosscuts driven from the tunnel. I did not know of this work when in that section, but will look it up on my first trip to Stewart in the spring.

Vetron Group. This group consists of four claims—*Vetron, Vetron No. 1, Vetron No. 2,* and *Vetron No. 3*—owned by Ben Erickson and W. Forrest, both "old-time" prospectors in this section. The claims are situated on the north side of Bear river, about 6 miles up from the end of the wagon-road and railroad at the mouth of American creek, or 20 miles from tide-water at Stewart. The four claims are staked in a square block, two above the vein and two below it. There is a first-class pack-horse trail from the end of the wagon-road to the foot of the hill on which the claims are located. From the foot of the hill to the *Comet* camp, at 3,375 feet elevation, there is only a prospectors' trail and it is "straight up"; however, there would be no difficulty in obtaining a fine grade for a trail about 4 miles long that would serve both properties.

The lower claims of the group are well timbered and any desired water-power can be developed from Rufus creek or Bear river. The prevailing country-rock is the Bear River formation, consisting of greenstone, agglomerates, breccia, etc.

At an elevation of 3,000 feet above sea-level and about 2,200 feet above Bear river, a quartz vein averaging about 2 feet in width has been traced by open-cuts for about 3,000 feet along the hillside. Where broken into the quartz is well mineralized with pyrite, chalopyrite, and a little magnetite and specular hæmatite. The vein strikes N. 60° E. and dips steeply into the hill, and on account of the steepness of the side-hill could be easily opened up at any point by short crosscut tunnels. An open-cut on the east end of the vein shows a mineralized width of from 8 to 10 feet in which are good bunches of chalcopyrite. Several felsitic dykes cut the vein at right angles, but apparently do not displace it in any way nor affect the mineralization. It is a promising showing.

Comet Group. There are two claims in the group—*Comet No. 1* and *Comet No. 2*—owned by Ben Erickson *et al.*, of Stewart. They are situated above and west of the *Vetron* group. There are three claims below these in another group owned by Erickson, Forrest, and others. The camp (tent) is at the edge of timber-line at an elevation of 3,375 feet and serves both this and the *Vetron* group. The showing on these claims is a vein up to 40 feet wide lying in greenstone formation and traceable on the surface for several hundred feet, the highest cropping being at an elevation of 4,750 feet. The vein gangue consists of quartz and calcite, well mineralized with arsenical iron, and in places considerable galena, carrying values in gold and silver. Values of $32 a ton in gold have been obtained from the arsenical iron. The strike of the vein is about N. 20° E. up the hill and its dip almost vertical. This year the owners gave an interest in the claims for a certain amount of work to be performed. This work consisted in sinking a shaft to a depth of 14 feet on the veins on a steep side-hill where the same depth could have been obtained with a drift of 20 feet on the vein. Here the vein is exposed for a width of 10 feet, which is evidently not its full width, as it crops just above showing mineralization across 40 feet. Very little work has been done other than the shaft, but it should be an easy matter to trace such a vein down the hill to near timber-line, where it could be opened up to much better advantage. This is certainly a splendid surface showing and well worth extensive development.

Another quartz vein, known as the "Blue vein," has been discovered lying several hundred feet to the west of the big vein and striking toward it. The owner claims it to be from 6 to 18 inches wide, carrying galena and chalcopyrite, with silver values of over $100 a ton. It crops in an overhanging cliff about 1,000 feet above the glacier, and with a few inches of snow on the ground I was perfectly content to take the owner's word for it.

Red Top Group. This property, owned by J. McNeil and J. J. Connors, has been under bonds since last spring to G. Seiffert, of Seattle, Wash., and associates. It is one of the older locations and had considerable work done on it in the early days, which, however, did not prove it either way. Under the personal supervision of Mr. Seiffert several hundred feet of crosscut tunnelling has been done this summer in a very miner-like manner. Conditions in the spring, owing to the destructive freshets, were very discouraging, and it looked for a time improbable that supplies could be got in to the property in time to get anything done. However, the main road and trail were repaired and mining-work finally got under way about a month later than under normal conditions. The old foot-trail from the main Bear–Nass trail to the camp, about 1½ miles, was improved to a horse-trail, and a good horse-trail also built from the camp to the upper tunnel.

Salmon River Valley from Premier Mine.

Bear Lake, Portland Canal M.D.

There are two showings on the property occurring in the Bear River formation (greenstone). At an elevation of 3,850 feet, about 400 feet above the camp, a fine showing of galena has been exposed in an open-cut. The vein at this point is about 5 feet wide, of quartz and calcite gangue, with inclusions of greenstone country-rock, all mineralized with galena and pyrite. On the hanging-wall is about 18 inches of banded quartz in which are small bunches of galena; the balance of the vein is a coarse conglomerate of quartz, greenstone, galena, and pyrite, the whole vein assaying, I should judge, about 20 per cent. lead. The silver content is 16.8 oz. in ore assaying 70.7 per cent. lead. The vein strikes east and west and dips with the hill at about 55° S. It has been traced diagonally down the hill for several hundred feet. At a favourable point on the steep side-hill, at an elevation of 3,510 feet, a crosscut tunnel is being driven on a bearing of N. 30° W. to cut the vein. It is estimated that it will require from 210 to 240 feet of a tunnel, of which 180 feet had been driven when it was necessary to quit on account of the heavy snow. This is a very promising showing, and considering the topography of the hillside I think it is being opened up in the best possible way.

At the camp another crosscut tunnel is being driven to get under the copper-showing briefly described in the 1919 report. It is 178 feet horizontally from the mouth of the tunnel to the showing, but as the dip of the vein is into the hill it will require a somewhat longer tunnel to reach it. The tunnel has been driven 132 feet, the first 50 feet through slide-rock, which required timbering and was therefore very slow work. Although this tunnel is expensive for exploratory work, I think Mr. Seiffert's judgment sound in getting the depth, especially when the bunchy and distorted nature of the surface showings are taken into consideration.

I understand that work will be resumed in the spring, and the extension of both tunnels will certainly be of interest and importance to this locality.

George Copper-Mines.

The owners did some surface work between the "white" and "green" veins and I believe extended the tunnel a few feet. However, the greater part of the season's work consisted in building a trail from the main Bear–Nass trail to the upper camp on the claims. This will be completed in the spring. The property is under option to the Algunican Development Company, Limited, and the trail-work is preparatory to extensive development-work next year. (*See* reports of 1917, 1918, and 1919.)

American Creek.

The trail was brushed out this year for 4 miles up from the mouth of the creek by the Public Works Department.

Two or three properties were investigated during the summer by engineers, and I am informed that there is every probability that work will be started on one in the spring. There was considerable development-work done in this valley in the early days, especially on the *Mountain Boy* group and the *Northern Terminus* on the opposite side of the valley. Some high-grade silver ore was shipped from the latter property and the *Montana* group some years ago.

Bitter Creek.

Jutland and Saint Elmo Groups.—The owners have been working on these two groups all summer and report encouraging results.

L.L. & H. Group.

This group of claims was staked in the early days of Stewart by Messrs. Lydden, Lade, and Hartley, and has had considerable work done by the owners in stripping, open-cutting, and tunnelling. The claims are situated up Hartley gulch, on the north side of Bitter creek, about 8 miles up from its mouth. The property is now under option to Mr. Tubman and associates, of Victoria. Mr. Tubman has been on the property all summer and a very creditable amount of preliminary work has been done.

There has been little activity on this creek in the past few years; consequently the Government trails have not been kept in repairs. This season's work, therefore, consisted largely of building a new trail up Bitter creek from the Bitter Creek trail to the camp, building a new cabin, putting in a trail from the camp to the workings, and later in the season doing a little surface work on the claims. Everything is now in good shape to go ahead with the development of the veins.

There are three parallel fissures lying in a somewhat broken and distorted country-rock of argillite intruded by greenstone. They strike at about S. 70° E., paralleling the gulch, and dip 60° N.E. into the hill. The vein-filling is partly quartz and partly broken and ground-up country-

rock, all more or less mineralized with arsenical iron and small amounts of galena and chalcopyrite in places.

The upper vein has been exposed on the surface by open-cuts and some depth obtained on it by a crosscut tunnel 35 feet long. The vein where cut by this tunnel shows about 1 foot of black, plastic mud on the foot-wall; then 16 inches of quartz; then about 16 inches of black, ground-up argillite slightly mineralized with iron pyrites. The quartz is mineralized with pyrite, disseminated and in bunches, zinc-blende, and a little galena, and carries fair values in gold and a little silver. Picked samples of the coarser heavy sulphides assay very well in gold. The tunnel was driven 7 feet beyond the vein in a greyish rock disseminated with iron pyrite, which may be a part of the vein-filling. The elevation of the tunnel is 3,700 feet.

About 300 feet (vertically) lower another tunnel has been driven 232 feet. It has cut the lower vein and cannot be very far from the middle vein. A very heavy flow of water was encountered from an open fissure in the rock, which makes it very disagreeable for working. This tunnel cut 45 feet of a more or less silicified and pyritized rock that should be investigated for milling-ore. About 4 feet of this next to the hanging-wall is well-mineralized quartz averaging, it is claimed, $44.60 a ton in all values.

To eliminate the difficulties of getting supplies, timber, and other material up the steep side-hill to the tunnels, Mr. Tubman proposes to start work farther up the creek, pick up the veins there, probably with a short crosscut from the edge of the creek, and drift on them. This work would obtain good depth on the veins, as well as be much more convenient for mining. Everything considered, the property is looking very promising, and I think the showings so far justify Mr. Tubman's plan of development.

Goose Creek.

Independent Group. This was reported on last year. The Algunican Development Company had an option on the property this summer, put a diamond drill on it, and drilled two holes. I understand that the vein was cut, but that there were little or no values in it; consequently the option was thrown up. No other work is reported on Goose creek.

Glacier Creek.

Lakeview Group. (*See* 1918 report.) Fetter & Carlton, of Seattle, had this group under option for the past year, during which time considerable exploratory work has been done under the supervision of Al. Harris. There are two veins on the claim. The main vein was picked up by further work in the tunnel a hundred feet below the cropping, which had been driven previously for this purpose without success. Drifting and raising on it on this level proved it to be as strong as on the surface and fairly well mineralized, but the values were very low and disappointing.

Work was then started on the upper vein, a small quartz vein from which high-grade silver ore had been extracted at the surface and shipped in early days by the owners. A 10-foot open-cut was made along the showing, a tunnel driven on the vein for 25 feet, and a shaft sunk from the open-cut to a depth of 57 feet on the vein. Some fine ore was found in the open-cut and values proved very satisfactory for a depth of 25 or 30 feet, below that becoming gradually less and very spotted. Some further work would have been done in the shaft, but an extension of time on payments due was objected to by the owners and the option was terminated.

Dunwell. This claim is owned by Stewart Bros. and W. Noble, of Stewart, and is situated about 2 miles up the west side of Glacier creek from the Bear River wagon-road. The general rock formation is argillite, termed by McConnell the "Bitter Creek formation." The vein, brecciated quartz and country-rock, fills a well-defined fissure in this formation, striking N. 70° W. and dipping flatly to the south-east at 38°. It has been well exposed by means of ground-sluicing for a length of about 300 feet and at intervals in that distance by three open-cuts. The upper of these cuts shows the vein to be about 6 feet wide, of which 4 feet on the hanging-wall side is mainly quartz heavily mineralized with pyrite, galena, and zinc-blende, the remaining 2 feet containing more argillite and less quartz and also well mineralized. I had not time to sample the vein; consequently can give no idea of the values. It is of good width, well defined and well mineralized, and altogether very promising-looking.

Columbia and Evening Sun, Excelsior and Eagle.—W. W. Rush, one of the owners of these two sets of claims, has been working on them all summer. I did not get over them this year, but they were reported on in last year's report.

For other properties the reader is referred to my report for 1919.

Salmon River Section.

This section takes in a small portion of the Eastern Contact Belt up the Salmon River valley, north of the Alaska-British Columbia boundary-line to the divide between the Nass and Salmon rivers. In area it is from 3 miles wide at the lower end to about 6 miles wide at the head of the valley and about 13 miles long—about 60 square miles. This is rather insignificant when compared with the immense area of this belt from the head of Salmon river north to Atlin, a distance of about 250 miles, which is absolutely unexplored.

A number of prospectors have been exploring the country over the Salmon River divide on the Nass River slope and some very fine specimens of high-grade silver ores are shown. Several claims were staked in there this summer. Trail facilities should be extended over both the Salmon and Long Lake glaciers into that region to permit of supplies being packed in on horses to a convenient point below the glaciers, say Tide lake, from which prospectors could then work in all directions.

An adequate amount of trail-work has been done throughout the section this year and the *Premier* wagon-road extended about 2 miles toward the head of the valley. This road when completed through, a further 4 miles, will provide the upper valley with freighting facilities for freighting in machinery of any kind and winter shipments of ore. The Alaska Road Commission has had the lower end of the road, from the boundary-line to the beach, in hand this year and will eventually make a first-class truck-road out of it.

There has been a noticeable increase in the amount of exploration and development-work done by owners and operators who have properties under bond. Since practically all of this preliminary work is done by hand, and consequently of limited amount, it takes two or three season's work to obtain any conclusive information. In the majority of cases the work has been sufficiently encouraging to warrant further development. In a few instances options have lapsed, not on account of disappointing showings, but due to lack of capital to proceed. Several companies were incorporated on prospects that had just been staked and on which no work had been done and no authentic examination made, the result being that not enough capital could be raised by stock-sales to commence work.

Considerable diamond-drilling has been done on several properties. By far the most noteworthy feature of the year for this whole area was the proving by diamond-drilling of the continuation of the high-grade ore-shoots to depth in the mine of the Premier Gold Mining Company. This not only assures the future of this property, but is of the utmost importance to the whole Salmon River valley and any other area in the Eastern Contact Belt of like formation.

Considerable has been written on the geology of this section, from which the following general deductions are made: R. G. McConnell's diagram, accompanying the Summary Report of 1911, shows three formations in the Salmon River area—granite, granodiorite, and quartz porphyry; the Bear River formation, consisting of porphyrite, breccia, agglomerate, and tuff; and the Nass formation, consisting of argillite and tufaceous sandstone. The oldest and predominating formation is the Bear River series, which is overlain in several places by the Nass series. These two series were intruded, first by quartz-porphyry dykes, then by the granodiorite of the Coast batholith, and lastly by numerous dykes ranging from quartz porphyry to augite porphyry. The quartz porphyry, known locally as greenstone, is the principal ore rock of the area. Ore-bodies are found in mineralized shear-zones in the porphyry, generally lying close to the tuff. Regional shearing roughly paralleling the granite range has developed these numerous shear-zones, the making of which was accompanied by silicification and pyritization, forming the primary low-grade ore-zones. Later fissuring occurred at an angle of 45° to the regional shearing and is represented by veins of quartz; high-grade silver minerals have been found in such veins and enriched deposits occur at the intersections of any of these three sets of fissures. These ore-bodies are in the form of lenses, irregular in shape, and have no well-defined walls or sharp limits between ore and waste. Opinions seem to agree that the principal high-grade ores of this section were unquestionably produced by the enrichment of the primary ores by ascending

secondary mineralizing solutions, and not from descending solutions containing metals dissolved from the overlying ores.

The majority of the properties in this section have been described in two previous reports, and readers are referred to these where details are omitted here.

Woodbine and Kitchener. These claims are owned by Dave O'Leary and are situated along the *Missouri* trail, on the west side of Cascade creek, about a mile above the bridge. Considerable work had been done by the owner in an open-cut along the side-hill, which opened up some fair-looking ore. An option was taken on the claims this spring by the Algunican Development Company and a diamond-drill outfit taken up. About 1,200 feet of drilling was done, but the results did not meet the requirements of the company and the option was terminated.

Pittsmont Group. This group consists of four claims and a fraction, situated about half a mile beyond the *Woodbine* claim and adjoining the *Indian* group on the south-west. The owners, Senator Ronan and associates, did some surface work late this fall and are well satisfied with the showing.

Glacier Group. This group comprises seven claims and a fraction, as follows: *Glacier No. 1* to *Glacier No. 7*, inclusive, and *Glacier Fraction*, staked last year and owned by Jancowski & Scoville. The claims lie west of the *Pittsmont* and *Boundary* groups, down to the Salmon glacier. The showing is a quartz vein from 3 to 4 feet wide, striking S. 80° E. into the hill and dipping about 45° S., where it is exposed along the side of a shallow gulch. The quartz is mineralized with pyrite and a little chalcopyrite. Values up to $240 a ton in gold and from 70 to 80 oz. in silver a ton have been obtained. The only work done is an open-cut into the vein where it is exposed on the side of the gulch, and another where the vein dips into the hill. Good depth could be obtained by drifting on the vein from the latter cut, and from its appearance it is well worth some development. The property is easily reached by trail branching from the *Indian* trail and skirting around Indian lake, in this way avoiding the glacier entirely.

Indian Mines, Ltd. (*See* 1918 report.) This company is one of the "early day" incorporations, with its registered office in Prince Rupert. L. W. Patmore is secretary of the company. The company's holdings consist of four Crown-granted claims. Its affairs are in good shape, only about 25 per cent. of the treasury stock having been used, and that for development-work on the property, which consists of 600 or 700 feet of underground work, with several open-cuts on the surface. This year considerable work has been done in open-cutting and stripping to trace the vein through from the "big cut" on the top of the bluff above the tunnel to the showing at the end line of the claim, over 1,000 feet. This work has proven very satisfactory. It shows a good width of vein, from 6 to 14 feet all the way, with milling values in gold and silver. Some of the cuts show 2 and 3 feet of good galena carrying about ⅓ oz. silver to the unit of lead. The consistency of the gold values contained in the pyrites gives reasons to expect that the continuation of the upper tunnel will probably open up a continuous body of milling-ore.

The face of the upper tunnel shows a width of 14 feet heavily mineralized with zinc, iron, and galena, 2 feet on the right-hand side looking exceptionally well. The extension of this tunnel is very desirable development. Altogether the property is one of the promising ones of the district.

Payroll Group.—This group lies just north of the *Indian*. Assessment-work only has been done this year.

Big Missouri Group. (*See* previous reports.) The group consists of sixteen full claims and four fractional claims, all Crown-granted, lying along the ridge east of the Salmon glacier for a length of 2 miles. It is owned by Dan and Andy Lindborg, of Hyder, Alaska, and associates. It has been under option for the past two years to the Pacific Exploration Company, Limited (D. D. Mann), with Dr. J. A. Bancroft acting in a consulting capacity. During this time it has undergone some exploration by open-cutting, tunnelling, and diamond-drilling. Last year diamond-drilling totalling 2,400 feet was done on the south-east corner of the *E. Pluribus* claim of the group, adjoining the *Mineral Hill* group. In all, nine holes were drilled. Five of these were vertical holes from the top of the ridge to prospect some very promising showings of high-grade silver ore that had been exposed on the surface in several open-cuts and trenches. While some very good ore was encountered in this

work, on the whole the results were not very satisfactory. A horizontal hole from the side of the hill and two flat holes and a vertical hole from the creek-level were also drilled, showing, I believe, little or no values. In the meantime a tunnel had been started just above the creek and driven about 80 feet. This year the tunnel-work was continued through the winter and driven a total of 360 feet on a bearing of N. 50° E., or diagonally across the two sets of fractures. No high-grade ore was encountered in the tunnel.

The diamond-drill was moved this spring to the "big showing" on the *Province* and other claims, and four holes drilled, aggregating 1,050 feet, three of 300 feet each and one of 150 feet; these proving to the satisfaction of the bonders that the showings, which extend over a width of about 1,000 feet and probably a length of two claims, or 3,000 feet, are only surficial and merely the residue of what must have been before eroded an extensive, flat-lying vein or ore-zone interbedded in the tufaceous country-rock. The results of this work on the *Province* claim and the previous findings on the *E. Pluribus* not coming up to expectations, the option was terminated by the Pacific Exploration Company.

An idea of the extent of the surface showings may be gained from the report of a prominent mining engineer, who estimated that every 20 feet of depth obtained would yield 1,000,000 tons of ore.

Similar conditions to those on the *Big Missouri* are found on the *Hercules* property, adjoining it on the north. Work this summer demonstrated that erosion has gone deeper and that the surface showings are the remains on the higher knobs of the flat ore-zone mentioned above. However, on the *Hercules* ground a very promising vertical vein has been discovered and will be explored next season. I think that after proving the surficial nature of the deposits on the *Missouri* more lateral drilling should have been done through the ridge and across the trend of the intruding mineralized quartz porphyries to prove whether or not there are any such dykes coming up to the flat ore-zone now remaining on the surface. Shear-zones along a contact of these quartz porphyries with the intruded tuffs are proving bonanza enrichments in the *Premier*.

Hercules Mines, Ltd.

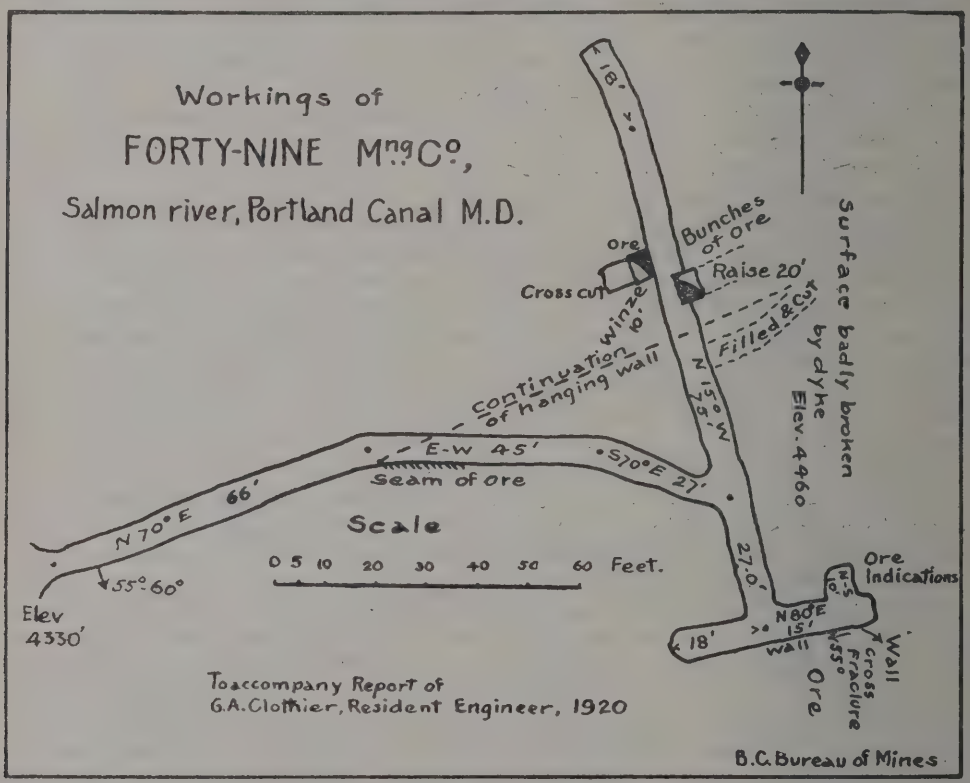
The holdings of this company consist of the Crown-granted claims *Glacier*, *Martha Ellen*, *Cornelius*, *Empire*, and *Leckie Fraction*, adjoining the *Big Missouri* group on the north. The property has been idle since 1911, but work was resumed this year under the management of General R. G. Edwards Leckie, with Joe Falls in charge of the work. The old work consisted of a number of trenches and open-cuts which exposed some exceptionally promising-looking showings of quartz and sulphides carrying good values in gold and silver. Very little depth, however, was obtained in any of this work. This year the principal work was the driving of a tunnel about 200 feet long under one of the most promising surface exposures and the sinking of a shaft about 30 feet on another cropping. The tunnel proved disappointing, in that no ore was found under the big surface showing. The shaft mentioned was sunk about 15 feet on an ore-body cropping on the surface, showing it to be cut off horizontally at that depth. The sinking was continued another 15 feet. This shows conditions about the same as obtained in the driving of the tunnels, and leads one to the conclusion that the ore found on the surface is the residue of a once extensive sill or bedded deposit of mineralized quartz porphyry contained in the tuff, and which has eroded until nothing remains but a few knobs here and there overlying the general Bear River formation. These are practically the same conditions found on the *Big Missouri* group, excepting that erosion has not been so intense on the *Missouri*, and the surface, therefore, is more extensively covered with ore.

Just north of the tunnel and following the bed of a small creek a quartz vein about 8 feet in width has been broken into in two or three places, tracing it for several hundred feet. Standing at the head of the gulch, the fissure occupied by the vein can be seen cutting the formation to the south. No work has been done except in a small canyon where the running water has kept the vein exposed. Samples across the vein here assay $10 a ton gold and 6.5 oz. a ton silver. This vein was not shown up until late in the season on account of the gulch being filled with snow. Winter camps were erected with the intention of getting underground on this vein before the snow came and continuing the work all winter. Sufficient preparations, however, could not be made and the winter supply of grub taken in; consequently the work was closed to be resumed next spring.

This company also has some promising holdings on Glacier creek, in the Bear River section, and elsewhere.

Forty-nine Mining Co.

This company is capitalized for $1,500,000 in 1,500,000 shares, with its head office at 701 Rogers Building, Vancouver. Its holdings consist of nine claims situated about 23 miles from tide-water on the east side of the Salmon glacier, and reached by the continuation of the *Big Missouri* trail. The claims have been surveyed this year and applications made for Crown grants. The property was worked all last winter with a crew of from eight to twelve men, but during the summer season only a couple of men were employed on some surface work. The main tunnel on the *Forty-nine* claim was driven 280 feet (*see* sketch), and the tunnel on the *Oxidental* claim was driven 95 feet.



In the latter the first 50 feet followed a small vein of shipping-grade ore that will average about 8 inches in width. There would be about 50 feet of stoping-ground above this tunnel, and therefore some little tonnage of shipping-ore could be taken from here. From the end of the ore the ground is more broken up, but the vein-fracture can be followed all the way. A short crosscut of 6 feet has been driven to the right at the face following a cross-fracture, but no ore is showing in it. There are indications of ore in the bottom of the main face and more work should be done there.

The main showing so far on the property is on the *Forty-nine* claim and has had the greatest portion of the development-work done on it. This showing strikes N. 70° E. and dips between 55° and 60° to the south-east. The main tunnel was started on the hanging-wall of the vein and driven on a bearing of N. 70° E., or following the vein, for 66 feet. It then turned 20° to the east to follow a small stringer of fair-looking ore for 45 feet, and from there to the crosscut it swung a further 20° to the east for a distance of 27 feet. A crosscut was then driven on a bearing of N. 15° W., about at right angles to the strike of the showing, for a distance of 120 feet, 93 feet north and 27 feet south. At the end of the south crosscut a parallel fracture showing some ore was drifted on for 33 feet. In the north crosscut, about 45 feet back from the face, a raise was put up 20 feet and a winze sunk 14 feet on some bunches of high-grade ore which apparently mark the main ore-shoot, as the continuation of the first 66 feet of the

tunnel along the hanging-wall of the vein would have struck it. Above the crosscut on the surface it can be seen that the vein has been completely shattered by the splitting-up of a light-grey-coloured dyke, and therefore about the least favourable place for crosscutting. About the best that could be expected would be small bunches of ore following the fragments of the dyke, and this is exactly what was found. A crosscut at a point about 75 feet in from the mouth of the tunnel would have cut under the better portion of the showing on the surface at a depth of from 60 to 70 feet, and in my opinion would have been better work.

On the *Million Dollar Fraction* claim, about half a mile north of the camp, an open crosscut has been put in showing a width of 25 feet of mineralization. On the hanging-wall side there is about 12 feet of pyritized schist; the balance is quartz heavily mineralized with pyrite, and very promising-looking ore. Judging from the surface, there is about 10 or 12 feet more of well-mineralized quartz that has not yet been cut.

Altogether there has been done about 450 feet of work on this property that has not been very effective in so far as the showings on the claims are concerned.

Yellowstone Group.

This group, owned by Bill Murphy, of Hyder, Alaska, and associates, has had a lot of surface work done on it, exposing some very encouraging-looking showings. I am informed that the survey of the *Forty-nine* group includes in that property some of the best showings that were always considered to be on the *Yellowstone* ground.

Salmon River Mother Lode Mining Co.

This company was organized early in the year with a capitalization of $100,000 in 1,000,000 shares at 10 cents a share, with its registered office at 402 Holden Building, Vancouver. It took over the *Mother Lode* group of six claims—*Mother Lode No. 1* to *No. 6*, inclusive—situated along the west shore of Salmon glacier about opposite the *Hercules* mines. There was no one on the property at the time of my trip into this section, and no information has been gained as to what has been done on the claims.

Several claims and groups along the east side of the glacier, north of the *Forty-nine*, as well as those bordering Summit lake, have had assessments done this year by the owners, who expressed themselves as very optimistic of that portion of the section. Trail facilities should be improved to the *Forty-nine* and extended as far as possible beyond.

Montana Group.—This group consists of four or five claims lying south of the *Forty-nine* group and east of the claims of the Hercules Mines, Limited. The owners claim to have exposed some very promising ore with assessment-work this year.

Salmon River Silver Mines, Ltd.

This company is capitalized for $50,000 in 500,000 shares at 10 cents a share, with its head office at 232–3 Pemberton Block, Victoria. Its holdings consist of two claims—*Sunset No. 1* and *Sunset No. 2*—situated at the south end of Dilworth mountain and adjoining the *Unicorn* and *Silver Tip* groups on the north. I have no information as to what work was done on this group this year. There was no one on the property at the time I was in the section this fall. These claims are not Crown-granted.

Unicorn Group.

There are four claims in the group—*Unity*, *Unicorn*, *Unicorn No. 2*, and *Unicorn No. 3*—owned by John Hoveland, of Hyder, Alaska, and partners. They are located east of and adjoining the upper claims of the *Big Missouri* group, and have been under option to J. B. McDonald, who did considerable work on them both this and last year. Last year's work consisted mainly of open-cutting; this year some 700 feet of diamond-drilling was done and the tunnel driven 210 feet. It was driven across the greenstone formation, in which are small stringers of barren quartz; a diamond-drill hole was then run straight ahead from the face of the tunnel for 250 feet. So far as could be seen from the core, the last 5 feet was the only portion of it that showed any encouragement, consisting of quartz mineralized with iron pyrite. On account of the snow I was unable to get over the surface and gain any idea of the objective of the drilling. Though the option was thrown up, the owners claim that the work was not detrimental to the property in any way.

Silver Tip Mining Syndicate, Ltd.

This syndicate was formed in Vancouver to develop the *Silver Tip* group of mineral claims—*Silver Leaf*, *Bella Coola*, and *May P. J.*—situated on Silver creek and adjoining the *Unicorn* group on the east. The property was reported on last fall by P. W. Racey, M.E., and has been under his supervision this year. The old workings on this property are on the south-west corner of

the *May P. J.* claim. The showing here is a small vein from 6 to 18 inches wide of fairly solid galena ore carrying in places silver values up to 120 oz. a ton. The vein, only open-cut in two or three places, follows the bed of a small creek which flows into Silver creek from the north. A tunnel was started from the bank of Silver creek to cut the vein, which lies very flat, and as a result the tunnel was driven all the way, about 40 feet, in the hanging-wall. This, however, is not an important showing for this group, as the vein would dip out of the property in a very short distance.

About 250 feet farther up Silver creek some work was done this summer on another ore-cropping. An open-cut was put in, disclosing a width of mineralization of about 16 feet, dipping south at about 45°. Across 8 feet on this cropping before it was broken into assayed 20 oz. silver a ton. The open-cut was driven 14 feet along the vein and continued as a tunnel a further 12 feet on the foot-wall. The face of the tunnel is now in evidently low-grade ore. Several open-cuts were put in above the tunnel in following the vein, which is badly leached and considerably closed in this direction.

The principal part of the season's work was done on the upper end of the *Bella Coola* claim at an elevation of about 3,800 feet, or about 500 feet above the camp, and consisted of numerous strippings, open-cuts, and deep trenches. The predominating country-rock is the Bear River formation overlain in places with slates. The altered intrusions of quartz porphyry through the volcanic tuffs and overlying slates are the chief mineral-carriers. Nearly all the work has been done on one of these dykes, showing it to have been crushed and the numerous diagonal fractures across it filled with quartz more or less mineralized with galena, sphalerite, and silver sulphides, some of these veinlets up to 2 inches wide assaying 400 to 500 oz. silver a ton. The dyke-rock itself carries little or no values; consequently the average values depend on the frequency and grade of the sulphides and quartz stringers. The dyke strikes east and west and the mineralization has been proven for a length of over 800 feet and from 25 to 40 feet wide. I have been informed by the engineer in charge, Mr. Racey, that the average values are satisfactory for a concentrating grade of ore. The ratio of concentration would be high and the concentrates very high grade.

Silver Crest Mines, Ltd.

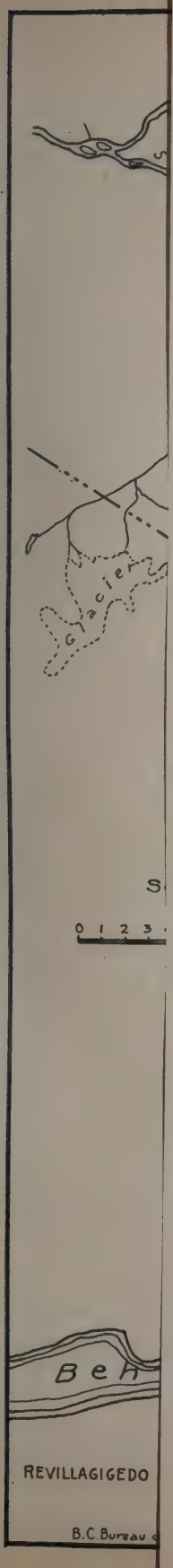
This company was incorporated under a capitalization of $500,000 in 2,000,000 shares at 25 cents a share, the head office being at 420 Rogers Building, Vancouver. The holdings consist of the *Silver Hill* group of eleven claims—*Ag. Fraction, September Fraction, Silver Crest Fraction, Argentite, Polybacite, Polybacite Fraction, Proustite, Pyrargyrite, Stephanite, Native, Hessite, Cerargyrite,* and *Stromeyerite*—situated on the east side of Dilworth mountain and adjoining the *Silver Tip* group on the north. The group has been surveyed and Crown grants applied for on eleven of the claims.

Similar geological conditions are found as briefly outlined on the *Silver Tip;* in fact, some work has been done on what looks like the extension of the mineralized dyke on the *Bella Coola* claim of the *Silver Tip* group. Altogether, more than twenty cuts have been put in to prospect small croppings of quartz. The majority of the work has been done on the *September Fraction.* Near the upper end line a long cut of about 50 feet has been put in, crossing a bunch of quartz stringers, all of which are barren, except about 1½ feet in width on the west end of the cut that assays 96.4 oz. silver a ton at a depth of 3½ feet. This showing was not found in open-cuts north of this which were evidently made to trace it farther.

South of these, four or five cuts were made on what seems to be the continuation of the dyke on the *Silver Tip.* The best showing here is about 3 feet of quartz assaying 20 oz. silver a ton. What appears to be the most important showing so far is at the south-west corner of the *September Fraction.* There are a bunch of small cuts here on stringers of quartz lying in rusty-looking slate, none of which look promising. However, a large cut across a porphyry dyke shows a mineralization of about 27 feet in width, striking east and west and dipping about 60° or 65° to the south, under the overlying slate. The average across this is about 10 oz. silver a ton, about 2 feet in the centre assaying $23 gold and 89 oz. silver to the ton. To the south-east of the cut another was made on the contact of the porphyry with the slate, exposing a width of 3 feet of ore assaying 20 oz. silver a ton. Although this is pretty close to the end line of the claim, probably 150 feet, a considerable tonnage of milling-ore might be opened up here. Taking everything into consideration, I think this area of the upper Salmon valley worth more extensive prospecting-work.

Salmon Glacier, Portland Canal M.D.

Silver Tip Claim, Salmon River.


Glacier
0 1 2 3
REVILLAGIGEDO
B.C. Bureau

SKETCH MAP

UNUK and SALMON RIVERS

PORTLAND CANAL M.D.

To accompany Report of
G.A.Clothier, Resident Engineer, 1920

Iskut river canyon

South fork

← 40 m. To mouth

Possible Trail, Iskut - Unuk

Approximate

Unuk r.

Sulphurets c.

Daley

UNUK RIVER SECTION

(See Report)

North fork

Glacier c.

South fork

Glacier

Glacier

Glacier

Granite c.

Cabin c.

Cabin 2100

Globe

Hoppe c.

3700

Tide Lake Glacier

Ajax

Tide lake 2350'

Long lake Glacier

Invincible

3000'

Summit lake

Olga

White Moose

War Eagle

Silver Shine

3600

Divide L.

Dilworth mt. & glacier

Forty Nine

Spider

Hercules

Missouri

Big

Long lake

Silver Lake

Indian L.

Premier

Texas c.

Bear river

Salmon river

STEWART

HYDER (Alaska)

PORTLAND CANAL

Note: Govt Road as Stewart Hyder

Scale of Miles

0 1 2 3 4 5 10 15

Unuk

Glacier

Glacier

Leduc river

Chickamin river

Glacier

Glacier

Glacier

Contact

Boundary

International

Burroughs Bay

Tidewater

Behm Canal

REVILLAGIGEDO ISLAND

B.C. Bureau of Mines

Spider Group. This group is comprised of three claims—*Spider No. 1*, *Spider No. 2*, and *Spider No. 3*—situated at the north-east end of Long lake. They were surveyed this summer and application made for Crown grants. The property is reached by pack-trail from "Joker Flat" over the low ridge between Silver creek and Long lake, a distance of about 1½ miles. Also there is a fair foot-trail branching from the *Premier* wagon-road to the camp of the Bush Mines, Limited, and following on up the East fork of Cascade creek, east of Slate mountain, to and along the west shore of Long lake. A wagon-road is under construction from the *Premier* road, crossing the East fork of Cascade creek and following along the west side of Slate mountain to Silver lake, and on up the valley to the *Big Missouri* and other properties. A branch from this road could easily be built to serve the *Spider* and other properties around Long lake.

This group of claims is owned by Bill Hamilton and Charlie Larsen, two old-timers of Stewart, and has been under bond to the Algunican Development Company, of Brussels, Belgium, for over a year. This company, under the very progressive local management of W. A. Meloche, has been very active this year and has spent approximately $100,000 in exploratory work on several prospects in the Stewart district. It is sincerely hoped that Mr. Meloche will be successful in making mines out of some of these prospects, for his company is certainly an asset to any mining district.

About 150 tons of supplies were taken into the property last spring, a distance of over 20 miles from the beach, on double-enders hauled by horses equipped with snow-shoes, and was the cheapest freighting done in this section, costing about $53 a ton. Camps were built, compressor installed, etc., and mining-work started early in May under the supervision of John Hoveland.

Surface showings indicate four or five quartz veins lying in an intrusive mass of augite porphyry. The north or No. 1 vein is the largest and oldest fissure and probably of lower grade contents than the balance. Later shearing action formed a series of roughly parallel, smaller, high-grade veins converging towards, and in one case intersecting, the larger and older vein. The No. 1 vein strikes S. 55° E. up the hill and dips about 65° E. No work has been done on this vein, except a couple of diamond-drill holes driven from the surface, which satisfactorily proved its continuity and values. On one of the smaller veins, No. 5, a tunnel has been driven about 700 feet, exposing several lenses of high-grade shipping-ore up to 3 feet in width. At a point 300 feet from the collar of the tunnel a raise for air purposes has been driven 60 feet through to the surface. On the No. 3 vein, south of No. 5, considerable surface work has been done in open-cutting along the vein, exposing a shoot of high-grade ore about 50 feet long and averaging 18 inches wide, assaying up to 300 oz. silver to the ton. The ore is a complex sulphide carrying zinc, copper, iron, lead, and silver. A crosscut will be run from the tunnel on the No. 5 vein to undercut this high-grade showing on the No. 3 vein, and should the high-grade ore be found at that depth, 150 feet, shipments will be made this winter. It may be expected that considerable enrichment will be found at the intersection of the small high-grade veins with the main vein.

Should the tonnage of milling-grade ore develop as expected, a concentrator is planned for next spring. The property has every appearance of developing into a profitable, small mine.

The country north of the *Spider* to the glacier has all been staked. This route is claimed by some prospectors to be the best into Tide lake, about 12 miles from the *Spider* camp over the Long Lake glacier. About fifty claims have been staked on the Nass slope and some provision should be made for a trail from the head of Long lake over the glacier. It should be staked out or marked in some way over the ice, so that there would be no difficulty in following it in any weather, and the approaches to the glacier made so that horses can be taken all the way through. With Tide lake as headquarters there is a big surrounding country for prospecting.

Mahood Mines, Ltd. This company was incorporated in March for $1,000,000 in 1,000,000 shares, with its registered office at 513 Pender Street West, Vancouver. The property consists of three groups of mineral claims—the *Divide* group, composed of *Divide No. 1*, *Divide No. 2*, and *Divide No. 3*, situated about 2 miles north of the *Spider* group and east of Divide lake; *Sunrise* group, composed of *Sunrise*, *Sunrise No. 2*, *Sunrise No. 3*, and *Sunrise No. 4*, situated along the east side of Long lake; and the *Mahood* group, consisting of the *S. & D. Fraction* and *Mahood Fraction*, situated at the foot of the glacier at the head of the East fork of Cascade creek; all of these groups being previously owned by

G. Mahood and partners. I have not seen any of the claims and have no information as to what or how much work has been done. It is claimed by the owners that high-grade ore has been found on all three groups. None of the claims are Crown-granted.

B.C. Silver Mines, Ltd.

This company was incorporated in October, 1919, by O. B. Bush for $1,500,000 in 1,500,000 shares, with the head office at 344 Pender Street West, Vancouver. The following claims were surveyed and Crown-granted this year and constitute the holdings of the company: *Oakwood, Holligan, Oakville Fraction, Oakville No. 2 Fraction, Texada, Texada Fraction, Humbolt Fraction, Humbolt No. 2 Fraction, Dixie, Mountain, Grandview, Bush Fraction, Neill Fraction, Halton, Simcoe, U. and I,* and *Rincon.* The first ten mentioned claims lie north of and adjoining the claims of the Premier Gold Mining Company, Limited, and the last seven lie south of the *Premier,* between it and the *International* group. Good camps were erected this summer on the ground north of the *Premier* and some diamond-drilling done. The property is under bond to Charles A. Banks, who intends continuing diamond-drilling operations next season.

Bush Mines, Ltd.

This company was incorporated over a year ago by O. B. Bush for $1,000,000, with shares at $1 par, the head office being at 344 Pender Street West, Vancouver. The property consists of the following sixteen claims, which were surveyed and Crown-granted this year: *Leslie M., Bell No. 2, Climax, Lesley No. 2, Lesley No. 3, Ax Fractional, Lesley No. 5, Gun Fractional, Lesley, Mahood, Lesley No. 4, Lesley Fractional, Limit, Lesley No. 6, Ten Fractional,* and *Bell.*

Some work was done on the property in the summer, but was closed down early in the fall. I did not get over the showings again this year and therefore refer the reader to last year's report. I am informed that nothing of importance was shown up this year, the work in the lower tunnel, at the big cut, exposing some stringers of high-grade ore, but not sufficient to be of importance.

Premier Gold Mining Co.

This company has been very active this year in putting the property in shape for producing on a scale commensurate with the extent and value of the ore-bodies. During the winter months 799 tons of ore was sledded to the dock and shipped to Tacoma, yielding 2,283 oz. gold and 77,180 oz. silver. The small tonnage is due to the unfavourable winter conditions for team-hauling. This winter two 5-ton Holt caterpillar tractors are being used and are proving very efficient. Up to the time of writing, February 1st, 1921, about 1,400 tons has been delivered at the dock from 9-Mile and shipped, and it is expected that as much or more will be shipped during the balance of the winter. Each tractor makes a round trip a shift from the beach to 9-Mile and return, and runs two shifts a day, hauling three sleds of 5 tons each to the load. The ore is delivered to 9-Mile from the mine, about 5 miles, by four-horse teams. In the summer the road from Hyder to 7-Mile is in an awful condition, but is each year being improved by the Alaska Government. An aerial tramway is contemplated from the mine to the beach.

An immense amount of construction-work has been done this year, though the season was short and disagreeable for outside work. A hydro-electric plant of 500-horse-power capacity was installed, power being obtained from Fletcher creek, with the power-house down on Cascade creek. A compressor plant and mining equipment were provided for opening up the mine by the Plate tunnel. Adequate and comfortable quarters for 100 men have been built. A concentrator of 100 tons daily capacity is in course of construction and will be in operation early in the spring. The flow-sheet for the mill will be approximately as follows: Mine-run ore to storage-bin of 100 tons capacity, bin to gyratory crusher, breaking to 1-inch size, to crushed-ore bin of 100 tons capacity, from crushed-ore bin over grizzly to rolls, crushing to ½ inch, to storage-bins of 100 tons. The crushing end is run by a 75-horse-power motor. From the storage-bins the crushed ore is fed automatically to a 5- by 10-foot Marcy ball-mill in closed circuit with a Dorr classifier; the overflow from the classifier goes to a 4- by 8-foot Denver ball-mill in closed circuit with a Dorr bowl classifier, from which the overflow, 150 mesh, goes to a K. & K. flotation-cell. The tailings from the flotation-cell go to a Dorr thickener; thence to an American filter-press, and from there to the first agitator of the continuous operating cyanide plant.

All of the above equipment of the property is evidence of the very gratifying results of underground development and diamond-drilling this summer, the latter proving the continuation and improvement of the high-grade ore-shoots now being mined from the Upper or No. 1 level.

For this winter's stoping a shaft was sunk 60 feet from the No. 1 level, midway between the No. 1 and No. 2 ore-shoots; a drift run both ways from the bottom of the shaft to open up both shoots, from which, as stated before, about 1,400 tons of high-grade ore has already been shipped.

With the opening-up of the property from the level of the Plate tunnel, which will give a depth of approximately 600 feet on the ore-shoots; the completion of the mill for the treatment of the low-grade ore; the provision of transportation to handle the shipping product; and with the known extent of the high-grade ore-shoots, this property bids fair to become the leading gold-silver producer in the Province.

Since the resignation of R. K. Neill the property has been under the management of Dale L. Pitt, with Bert F. Smith as assistant manager.

International Group.

This group is composed of eight claims and is owned by Pat Daly, of Stewart, and associates. The claims lie just above the boundary-line and are easily reached from the 11-mile road-house by a good trail. A little surface work was done this summer and the tunnel extended a short distance, with two men working. Nothing new reported.

Unuk River Section.

This section is now included in the Portland Canal Mining Division, with its Mining Recording Office at Stewart instead of Anyox.

The mineralized portion commences about 3 miles above the Alaska-British Columbia boundary, furnishing prospecting-ground on both sides of the river to its head, a distance of over 20 miles. Two reconnaissance parties were outfitted and sent into this section this summer by the Department of Mines. Each of these parties consisted of three men. One party went up the Unuk river and the other over the Salmon glacier via Stewart, meeting each other on the South fork of the Unuk river, about a mile below the *Globe* group of claims and about 12 miles up from the main river.

The Salmon Glacier party had its supplies and outfits packed to the first camp just above the *Hercules* on July 9th, losing a portion of it fording the Bear river during the spring freshets. From this camp four relays were made in packing on their backs to the head of Tide lake, where a base camp was made on July 28th. From this camp several attempts were made to find a route over the glacier lying between Summit and Tide lakes to the South fork of the Unuk or a branch of it. Failing in this, they then tried over the next glacier at the foot of Tide lake, and after two attempts made the South fork on August 30th, following down Cabin creek from the foot of one of the branches of the main Tide Lake glacier and very luckily meeting the up-river party who were returning from a trip to the *Globe* group on the South fork. This work shows conclusively that there is no useful route from the Salmon glacier to the Unuk basin. The party reports a well-mineralized country from the *Forty-nine* to and in the vicinity of Tide lake, the formation being similar to that of the Salmon River basin. With about a mile of trail from the *Forty-nine* to get on the Salmon glacier, and 5 or 6 miles over a good grade from the end of the glacier to Tide lake, the country would be in good shape for transportation and prospecting.

The up-river party left Prince Rupert on June 14th for Ketchikan, proceeding from there by launch to a point about 4 miles up the Unuk river, which flows in at the head of Burroughs Bay. From this point the trip was made in a 24-foot river-boat by poling and lining along the banks and bars to the second canyon, a mile or two above the boundary-line. Supplies were portaged there and an old boat repaired for the balance of the trip. Owing to the abnormally high water this year, due to the sudden heavy rains before the snow had melted, the river was not navigable for a couple of weeks and difficult and dangerous all summer. On the return trip the party got tangled up with a snag about 10 miles up from the mouth of the river. The boat was smashed to pieces and a lot of personal belongings and the most of the remaining supply of grub lost. Fortunately the party was picked up a few days later by a party of United States surveyors coming down the river and landed in Ketchikan. This trip proved decisively that up the river is the only possible way of access to this portion of the district, and also that the water route is of no use to the ordinary prospector, being too expensive for outfitting, difficult, and dangerous. The only feasible way of making this area available to the prospector and ultimately to the operator is by means of a good pack-horse trail built on a wagon-road grade

from the mouth of the river to the mouth of Sulphurets creek, a distance of about 40 miles, and branch trails up the main tributaries.

It is about 24 miles from the mouth of the Unuk to the boundary, through Alaska; the balance of the work would be in British Columbia. About twenty years ago a wagon-road was partially constructed from tide-water to 2 miles beyond the boundary, of which portions are in not bad repair, but would require all new bridges and about 3,000 feet of rock-work in two places where the bluffs border the river-banks. From the boundary up the main river would not be a difficult or expensive trail to build.

This is an extensive, and very possibly rich, area of the Eastern Contact Belt that could be made accessible with a comparatively small expenditure, and on account of the easy grade is more favourably located for ore transportation than that portion of the district over the Salmon River divide on the Nass slope, though it is farther from tide-water. There is good land at the mouth of the river for raising horse-feed, and one of the ranchers has signified his intention of furnishing pack-horses if a trail were built.

The party, though having no time for any detailed exploration, report plenty of float minerals in the different creeks and generally a good-looking country for prospecting.

STIKINE MINING DIVISION.

An increasing amount of interest is being taken in this Division, and without doubt more activity will result when prospectors realize that there is a big area of the Eastern Contact Belt that is more accessible along the Stikine and Iskut rivers than in other more southerly portions of the District. Some little prospecting was done along the Stikine River and there were a couple of parties up the Iskut river working south toward the Unuk. From the map of the Boundary Survey I do not think there is any trail route via the South fork of the Iskut to the Unuk river. However, there may be a route across from the foot of the canyon on the Iskut to the head of the North fork of the Unuk, a direct distance of about 15 miles. (*See* sketch.) I think, though, that each of the areas on the Eastern Contact Belt will have to be opened up separately; that is, the Unuk area by way of the Unuk river from the coast, and the Iskut area by way of the Iskut river itself, with trails from the river up its different tributaries. The only use a trail along the eastern flank of the Coast range would be for a guidance to prospectors working between the drainage-basins of the different rivers cutting through the granite.

The eastern border of the Coast granites crosses about a mile below the head of Alice arm, about a mile above the head of Portland canal, 3 miles above the boundary on the Unuk river, follows the east bank of the South fork of the Iskut for some distance, and cuts across the Stikine river about 15 miles below the Grand rapids. It roughly parallels a line drawn from the mouth of Portland inlet to Juneau.

Very little mining-work was done in this Division this year, and the reader is referred to last year's report for descriptions of the more prominent prospects. The Jacksons have been working on their placer-ground up Clearwater river all season, but no information is obtainable as to results. The gravel-deposits along this river are worth investigating by drilling for hydraulicking and dredging purposes, and the area is well worth prospecting for mineral-deposits.

No work has been done on the claims of the Iskut Mining Company, which are situated about 36 miles up the Iskut from its mouth. These claims are all Crown-granted. Prospectors going up the Iskut must take advantage of the low water in the early part of the season, as navigation for small boats is practically impossible after the water rises. The feasibility of clearing a channel of snags, sweepers, and log-jams has been pointed out in previous reports, and until such work is done, giving some assurance to the prospector that his work will be of some benefit to him, the development of the country will be at a standstill.

LIARD MINING DIVISION.

This Division occupies the north-eastern corner of the Province and is the most remote and least known of any of them. The only portion of it that has had any development whatever is around Dease lake and along Dease river, which drains the lake and flows into the Liard river, which in turn empties into the Mackenzie river at Fort Simpson. About $5,000,000 was taken out in placer gold from Dease and Thibert creeks, flowing into Dease lake, and McDame creek, a tributary of Dease river. This part of the Division is reached by way of

Telegraph Creek, at the head of navigation on the Stikine river, from which point a good pack-trail runs to the head of Dease lake, a distance of 72 miles. Two pack-trains operate between Telegraph Creek and the head of the lake, leaving at five-day intervals. Freighting costs 8 cents a pound to the lake and an additional 1 cent a pound down the lake to Porter, a distance of 25 miles. There are no regular transportation facilities beyond the lake. Judging from the amount of gold that has been taken out from the small area operated, there is every reason to believe that a wider range of more thorough prospecting than was given the country in the early days would find as rich diggings. A number of mineral claims were staked years ago, but there has never been any real search for mineral in this section because of its isolation and the lure of the placer gold.

Last year's operations were productive of such good results that considerable interest has been taken in the section this summer in prospecting for hydraulicking-ground.

The principal work has been done on Thibert creek and its two tributaries, Deloire and Mosquito creeks. As noted in last year's report, the operations of George Adams on the old Thibert Creek Mining Company's ground proved very encouraging and gave quite an impetus to this whole section this year. It was found this spring that owing to the settling of the high bank along which the flume was built, due to the workings of the old company along the base of the hill, water could not be brought to last year's pit, and therefore necessitated the removal of the whole plant about a mile farther up the creek and the opening-up of new ground. With the scarcity of labour this looked like an impossible undertaking this spring, but was nevertheless done. Hydraulicking was then started in cleaning out an old pit and extending it farther into the bank, with the hope that the old channel had not been reached by the old workings as had been proven in last year's work down the creek. This dead-work, from which the clean-up was only about 100 oz., took the whole season and the results of the summer's work were therefore discouraging. Adams is working under a serious handicap of a lack of sufficient water to handle the excessive amount of overburden. The installation of about a mile of 36-inch steel pipe is necessary for the success of what has every appearance of being a very extensive enterprise. However, with only a pack-trail from the head of navigation, it will be impossible to get in such an amount of pipe. Mr. Adams has informed me that he will resume operations as early as possible in the spring.

On Deloire creek, a small stream emptying into Thibert creek about 2 miles up from the lake, a number of leases were acquired by Captain Barrington and associates, on which two men worked steadily all last winter driving a bed-rock tunnel. This work showed very satisfactory pay on bed-rock and it was decided to install a hydraulic plant in the spring and go after it. Owing to lack of labour it was, however, agreed to combine forces and concentrate on Adams's work; therefore nothing was done on this ground this summer. Latest information is that it will be worked next season.

On Mosquito creek, flowing into Thibert about 12 miles up, George Adsit has been working all summer on the lease that he has held for a number of years, and on which he has certainly done a lot of work for one man in getting the ground in shape to work. Although a good deal of the surface has been ground-sluiced away, bed-rock is yet about 20 feet deep, which means a lot of dead-work, and this summer his yield was only about 20 oz.

In 1918 two leases were acquired, lying about Adsit's ground on Mosquito creek by a party of returned soldiers. This year they succeeded in interesting the Provincial Department of Industries to the extent of granting them assistance to open up this ground, and a party of seven or eight went in early in May with a good outfit. Unfortunately the men, with one or two exceptions able and willing to work, were inexperienced in this kind of work, and the leader who had taken "command" of the expedition knowing nothing about anything in connection with placer-mining, the enterprise was inevitably a failure. The mouth of this creek proved rich diggings in the early days, and the lease above this, now held by George Adsit, shows good pay, so that it is fairly reasonable to suppose that the ground adjoining Adsit's above, and owned by the returned men, would prove equally as good. It is regrettable that, with a bunch of able and willing men, advantage could not have been taken of the assistance provided by the Government and sufficient work done to open up and prove the ground.

Some sluicing was done on Dease creek by Bryan & Hankin, who took out about 20 oz.

On McDame creek the Princess May Hydraulic Company, under the management of Amos Godfrey, built a new flume 240 feet long and moved considerable overburden, getting, I am

informed, some very encouraging prospects on bed-rock. Anderson and two or three others have been persistently prospecting on this creek for several years.

Various prospectors throughout the Division washed out probably 60 oz. more, bringing the total yield up to about 200 oz. for the year.

Coal was discovered and staked on the Tuya river years ago, but nothing further has ever been done toward exploring it.

A pack-trail was built in 1874 from Telegraph Creek to the head of Dease lake and is still used as a pack-trail. It answered all requirements for a number of years while operations were confined to placering, but, with the exhaustion of the placer and the development to hydraulicking and dredging, as exemplified in the Yukon and Atlin districts, the trail should have developed into a wagon-road to meet the requirements for transportation of the heavy machinery and outfits necessary for such operations. Under present conditions there is little probability of any prospecting for minerals being done. There is no doubt that the potentialities of such an immense area of the Province fully warrants the investment of the comparatively small outlay necessary to complete the wagon-road through to the lake.

Office statistics show that nine new leases were granted. The effect of the new "Placer Act" of 1920, whereby leases will have to be worked or revert to the Crown and again become available for staking, will have a very beneficial effect.

ATLIN MINING DIVISION.

Since I have been unable to cover any portion of this Division this year, I am indebted to J. A. Fraser, Gold Commissioner at Atlin, for my information of the mining situation. Mr. Fraser furnishes a very comprehensive report of the mining activities in both the Atlin and Rainy Hollow sections, and as anything I could say would simply be a repetition of this, I will refer the reader to this report on page 71.

It is worthy of note that lode-mining in both sections is apparently receiving merited attention. The success of the *Maid of Erin* property in Rainy Hollow and the improvement of transportation facilities to admit of its shipping would furnish the necessary stimulus for the thorough exploration of that very promising section. Reports of J. M. Ruffner's operations on Crater creek are very favourable, and there appears to be a chance of the legal affairs of the *Engineer* mine being sufficiently straightened out to permit its operation.

I intend getting over this division thoroughly next season.

In concluding this report, I wish to express my appreciation of the assistance given me by prospectors and operators throughout the district.

CASSIAR DISTRICT.

ATLIN MINING DIVISION.

Report by J. A. Fraser, Gold Commissioner.

I have the honour to submit my report on mining operations in the Atlin Mining Division of Cassiar District for the year ending December 31st, 1920.

Of over 300 men who were in the district during the summer, at no time were there over 200 engaged in mining and prospecting. Of those so employed, at no time were more than 150 engaged in placer-mining, about ninety being engaged in actual production and sixty in prospecting or dead-work, getting down to bed-rock and pay-dirt.

About forty men were engaged in lode-mining and prospecting, but there was no output reported and no shipments made so far as I have learned.

In view of the situation herein-above revealed, the scarcity of labour, the limited supply of water on some of the creeks, and the shortness of the season generally, it is rather astonishing that the output was even as good as it was. Altogether the outlook for the next season is considered encouraging.

There was a falling-off in the output from that reported the previous season, but that was confined to three or four creeks where the operating forces were engaged for a good part of the season in moving plant and other dead-work, the benefits of which the operators expect to enjoy this coming season.

Notwithstanding the above-mentioned conditions, the amount of revenue actually collected was in excess of that of the two previous years.

McKee Creek.

Taking the creeks in the same order as for some years past, I may say that on McKee creek nothing was done beyond protecting the plant and workings during high water and such-like services, which kept one man in occupation practically throughout the season. Some activity was fully expected to have been undertaken there last season, but the president of the company died suddenly early in the summer and some reorganization appears to have been deemed necessary which apparently halted development; but I am pleased to report that some prospecting operations are being carried on there this winter, and it is hoped and expected that the results will justify the renewal of active hydraulic operations upon that creek next season.

Pine Creek.

On Pine creek from twenty-five to thirty men were operating throughout the season, of whom between fifteen and twenty were operating hydraulically at three different points. Two outfits were operating on "lays" from the Discovery Mining and Power Company, Limited, and the other outfit was resluicing tailings upon ground held by the Atlin Gold Mines Company. The results of these operations appeared to be satisfactory to all concerned.

Two other small outfits were doing dead-work and prospecting throughout the greater portion of the season. One outfit did not recover any gold, but the other crew (from four to six men), while doing dead-work, which involves running a drainage-tunnel diagonally across under the bed of Pine creek with a view to providing gravitation drainage for the ground on Gold Run, were more fortunate and recovered a fair amount of gold in portions of the gravel encountered, and they are very sanguine of securing good returns when they get through. This work is being carried on throughout this winter, and it will take them some months yet to reach the pay-gravel they are after on the other side.

Spruce Creek.

On this creek from thirty-five to forty men operated pretty continuously throughout the season and quite a number throughout the year; those latter carrying on drift-mining, of which more is done on this creek than on any other in the district.

During the summer quite a number of men were carrying on open-sluicing and still others were prospecting; perhaps 25 per cent. of those on the creek were prospecting or doing dead-work. Once more, however, this has been the banner creek for production and the output *per capita* was good, which means that a number of the operators did very well indeed.

One-half or more of the summer force is drift-mining on that creek this winter, and as several new leases have been located on the creek we may expect a continuance of those or similar operations for years.

Birch Creek.

On Birch creek H. P. Pearse operated with a small force and secured good returns for the period of available water, but as that period was very short the season's operations were not what they might have been, but he is still looking forward to another season's operations and hoping for better conditions, which will enable him to speedily recover the minus balances of some past seasons, for apparently the gold is in the gravel if he can only secure sufficient water for a reasonable run throughout the open season to remove the gravel and recover the gold.

Boulder Creek.

About fifteen men were employed on this creek during the season, of whom at least one-third were engaged in installing new reservoirs and plant and other dead-work, but notwithstanding this the returns were satisfactory and the outlook for next season is encouraging.

On this creek a new operator in the person of W. F. Gore, of Seattle, Wash., has secured the holdings of J. H. Black & Co. on upper Boulder, and from the result of the season's operations he appears to be well satisfied and intends operating a much larger force next season.

Charles Miller operated on lower Boulder, but with a smaller force than usual, principally because men were not available.

Ruby Creek.

On Ruby creek the Placer Gold Mines Company, under the management of T. M. Daulton, commenced operations on May 30th and ceased on September 20th. Camp was actually opened on May 6th, but much time was lost in moving plant, pressure-box, etc., up-stream, and as only about half a crew was obtainable the output was not as large as usual, but was quite up to the average for the time and force employed. They expect to operate in full force this coming season if labour conditions prove satisfactory. About twelve men were employed by this company during the summer and a number of men are "drifting" on the creek this winter.

On upper Ruby creek four or five men were engaged prospecting and sinking to find bed-rock, and one crew expended about $2,500 in their efforts to do so without reaching their objective, but they intend continuing next summer and will doubtless accomplish their purpose.

No gold was recovered in any of those prospecting operations, but it is expected that a much larger force will be operating on the creek next season.

Wright Creek.

On Wright creek six or seven men operated throughout the season, but again it was mostly dead-work throughout, but about the end of the season one crew of four men found themselves on the edge of the channel for which they were seeking, and they are eagerly awaiting the advent of another open season so as to continue their exploration.

The other operators recovered some gold, but not sufficient to cover the cost of the season's dead-work. They are also hopeful for the future.

Otter Creek.

On lower Otter the Mines d'Otter, under the superintendence of Henri Maluin, with J. E. Moran as foreman, commenced operations about April 25th and carried on until the end of October at an expense of about $16,000, but, I regret to say, without uncovering bed-rock proper, which, however, they believe they have uncovered in one corner of their last pit, which encourages them to continue the work next season. Piping was carried on from May 15th to October 17th and about 200,000 cubic yards of overburden and gravel was removed. In the prosecution of this work considerable gold was recovered upon a false bed-rock of hard clay, as was done during the last four seasons, but not sufficient to cover the season's expenses.

Dog-team on Salmon River, Portland Canal M.D.

Discovery Creek, Atlin—Hydraulic Mining.

Two or three men operated and prospected on upper Otter for part of the season and recovered some gold, but were not encouraged to continue because of water conditions. I have had no report from them, so cannot speak confidently as to their financial success.

Lincoln Creek.

On this creek a small force of men operated for the greater portion of the season, but were again compelled to abandon their works because of the threatened danger from slides and caving induced by the presence of strata of glacial mud betwixt the strata of sand and gravel, so that another season has passed without revealing whether or not that creek is to be numbered amongst the producing creeks of the district.

The operators are more encouraged than ever to believe it will be if they can once reach bed-rock and secure a working-face, for they have found gold from the grass-roots down, and it has practically all the other characteristics of a good hydraulic proposition—good water, grade, dump, reservoir facilities at the head, and plenty of timber within easy reach. Doubtless operations will be resumed in some form as soon as local conditions will permit.

Davenport Creek.

This creek lies a little to the north of but not far from Lincoln creek, and encouraging prospects were found upon it some years ago, but nothing has been done on it for some time, principally because of the illness of the party who did most of the prospecting; but this party has at last secured sufficient capital to give it a reasonable test and men are prospecting it this winter by means of tunnels. If bed-rock reveals anything like what the surface indications seemed to warrant, I expect a plant of some kind—probably hydraulic—will be installed next season.

Wilson Creek.

On Wilson creek six men part of the time and one or two men practically throughout the season were operating, mostly prospecting, and some gold was won, but not sufficient to cover the outlay; it was sufficient, however, to encourage continuation, and as some more leases were located on the creek last summer I expect there will be a much larger force operating there next season, provided men are available.

Slate Creek.

Two men were prospecting throughout the season on Slate creek and two also on Feather creek without attaining their objective, but they intend to continue next season.

O'Donnel River.

On O'Donnel river seven or eight men were operating the greater part of the season. Most of this work was of a purely prospecting nature, and although a certain amount of gold was reported by some of the operators, the fact that several leases have been located since January 1st by some of those who have not reported any results from their prospecting seems to justify the assumption that the said results were satisfactory, or encouraging at least, and we are justified in expecting the presence of a considerable force upon that stream next season, provided the men are available.

Other Creeks.

Nothing has been reported with respect to development upon Bull, Burdette, Cracker, Fox, Graham, Granite, Hemlock, Horse, Union, or Volcanic creeks during the past season, although certain individuals have been reported as making good wages prospecting and sniping on some of them.

Placer-mining.

The recent amendments to the "Placer-mining Act" with respect to leases have had a beneficial effect in this district, the consequence being that about half the number of leases held in the district have been allowed to revert to the Crown, but the other half have been consolidated and the revenue materially increased by the payment of arrears, as well as current rentals, and there will not be any encouragement henceforward to hold considerable areas in lease form without any effort at development, as had become the practice in recent years. With respect to the leases which have lapsed, I am satisfied that very few of the lessees would have done any-

thing even if permitted to hang on indefinitely, and such holdings had become a detriment to the development of the district.

MINERAL CLAIMS.

Another year has passed during which apparently not much beyond what was necessary to protect title has been done with respect to quartz properties throughout the greater portion of the district. Two notable exceptions are with respect to the properties located upon or in the vicinity of Crater creek, a tributary of Fourth of July creek (about 14 miles from Atlin), and the properties commonly known as the *Maid-of-Erin* group in the Rainy Hollow section.

With respect to the silver-lead properties situated on Crater creek, I may say that J. M. Ruffner, who had spent considerable time and means in prospecting and investigating those deposits in 1919, secured control of twenty-five or more claims, and during last winter succeeded in organizing a small company in Seattle which undertook to supply the necessary capital to reasonably ascertain the probable potentialities of the group.

This he undertook to do systematically and commenced operations as early as climatic conditions would permit, and with a force of from five to ten men, amongst whom was a qualified assayer, pursued his exploratory work until midsummer, when apparently his backers found themselves unable to supply the necessary funds and the operations were consequently suspended for the time being.

This suspension was a matter of keen disappointment not only to the manager, but to every one interested in the development of the district, for the work done appears to have disclosed the existence there of a very large and continuous body of ore in which silver seems to predominate, but with lead, copper, and gold more or less closely associated. One main ledge is said to be traceable continuously for 3 miles or more, and some of the assay tests revealed values approximating or exceeding $400 a ton, while in some portions the gold values were estimated to be sufficient to cover cost of operation. In any event sufficient ore has already been exposed to warrant thorough investigation, which will be resumed as soon as the hills are bare again.

In Rainy Hollow R. W. Wiley, of Portland, Oregon, who had secured options on the above-mentioned *Maid-of-Erin* and associated claims (13½ in all), commenced operations about the end of June and prosecuted development until some time in November. His operations, I believe, were confined to the *Maid-of-Erin* claim, but, although considerable ore was sacked ready for shipment, the condition of the roads on both sides of the International Boundary precluded shipment, unless such has been undertaken since winter set in.

With respect to the *Engineer* mine, I may say that not much development has been attempted since the death of the late Captain James Alexander, who was the registered owner at the time of his death. Last summer four men were engaged in development-work for a portion of the season, but this work was halted from time to time to permit of examination of the underground workings by mining engineers representing prospective purchasers. No shipments of ore were made nor was the stamp-mill used.

As the ownership and even the title to the property has been challenged, not much, if anything, will be undertaken until the pending litigation is disposed of. It is unfortunate for the district that those difficulties have arisen, as they have a decidedly deterrent influence upon the development of this part of the district, for, whether reasonably or otherwise, prospective purchasers as well as present owners appear to be "marking time" awaiting developments with respect to the *Engineer*.

It is hoped that all those matters may be finally settled at an early date, so that some person may proceed with the development and operation of that property and thus set the wheels of progress in motion again.

Nothing has been done towards the development of the coal or hydro-magnesite deposits in this district since last report.

OFFICE STATISTICS—ATLIN MINING DIVISION.

Free miners' certificates issued (individual)	330
Free miners' certificates issued (company)	4
Placer records	5
Placer rerecords (representing 187 claims)	174

Leases applied for	17
Leases issued	32
Certificates of work (leases)	81
Leaves of absence (representing 104 claims)	30
Filings (placer)	2
Bills of sale, etc. (placer)	14
Bills of sale, etc. (hydraulic)	32
Bills of sale, etc. (mineral)	11
Mineral records	37
Certificates of work (mineral)	112
Filings (mineral)	6
Crown grants issued	2

Gold reported.

Gold-output reported or estimated—	
As won by individual miners and partnerships	$ 83,090 00
As won by companies	51,360 00
Total output	$134,450 00

Revenue.

Land revenue	$ 360 00
Water revenue (rentals)	93 60
Free miners' certificates (individual)	1,534 50
Free miners' certificates (company)	350 00
Mining receipts (lease rentals)	4,837 50
Mining receipts (lease applications)	340 00
Mining receipts (other sources)	1,961 90
Receipts from all other sources	12,238 68
Total	$ 21,716 18

STIKINE AND LIARD MINING DIVISIONS.

Report by H. W. Dodd, Gold Commissioner.

I have the honour to submit herewith the annual report on mining operations in the Stikine and Liard Mining Divisions of Cassiar for the year ending December 31st, 1920.

The year was a lean one as far as production is concerned, brought about by unsettled labour conditions and high cost, so that the expectations of 1919 were not fulfilled.

Placer.

Thibert Creek.—On this creek George Adams had an average of six men working all season; the plant was moved up-stream three-quarters of a mile and a rock-cut put through the rim for 250 feet; two pits were then opened, one 100 by 50 feet and the other 250 by 150 feet, with satisfactory results.

Deloire Creek.—On this creek Captain S. Barrington had two men at work all season prospecting on Leases 50–102–6–7; an open-cut was made about 400 feet, starting at zero at the lower end of the leases and working up to 15 feet in depth, on which good prospects were obtained.

Dease Creek.—On this creek Bryan & Hankin have done considerable work on Lease 103 and have placed it in fair shape for the coming season.

McDame Creek.—On this creek the Princess May Hydraulic Company, under the management of Amos Godfrey, had eight men working the greater part of the season; a new flume of 240 feet was put in and considerable overburden removed; bed-rock was not all uncovered, but the prospects obtained were encouraging.

Nine new leases were granted during the year, and with the new "Placer Act" of 1920 into effect, a lot of the ground which has been lying idle will be either worked or thrown open.

MINERAL.

Apart from the necessary assessment-work in order to protect claims, nothing much was done.

As the annual report of the Resident Engineer, Geo. A. Clothier, will cover everything, I will have nothing more to add.

OFFICE STATISTICS—STIKINE AND LIARD MINING DIVISIONS.

Revenue collected from free miners' certificates	$ 593 50
Revenue collected from mining receipts	1,768 40
Revenue collected from other sources	4,584 79
Total	$6,946 69

SKEENA DISTRICT.

SKEENA AND BELLA COOLA MINING DIVISIONS.

Report by J. H. McMullin, Gold Commissioner.

I have the honour to forward you herewith the office statistics of the Skeena and Bella Coola Mining Divisions.

The report of the Resident Engineer fully covers the mining development for the year and I have nothing further to add to his report.

Office Statistics—Skeena and Bella Coola Mining Divisions.

Free miners' certificates (individual)	530
Free miners' certificates (special)	7
Mineral claims recorded	151
Certificates of work issued	143
Bills of sale, etc., recorded	52
Certificates of improvement issued	2
Filings	15

Revenue.

Free miners' certificates	$2,784 00
Mining receipts, general	1,558 15
Total	$4,342 15

NASS RIVER MINING DIVISION.

Report by John Conway, Acting Mining Recorder, Anyox.

Office Statistics—Nass River Mining Division.

Free miners' certificates (individual)	606
Free miners' certificates (special)	2
Mineral claims recorded	1,108
Certificates of work issued	670
Bills of sale, etc., recorded	381
Filings	88
Certificates of improvements recorded	17

Revenue.

Free miners' certificates	$ 2,588 00
Mining receipts, general	7,567 35
Total	10,155 35

QUEEN CHARLOTTE MINING DIVISION.

REPORT BY J. L. BARGE, MINING RECORDER.

I have the honour herewith to submit my annual report for the Queen Charlotte Mining Division for the year ending December 31st, 1920.

During the past year very little development-work worthy of mention has been in progress. The *South Easter* and the *Ikeda* mines are, I believe, in process of reorganization and greater activity is expected during 1921.

Jones & McRae have a very promising ledge uncovered at Kootenay harbour, on the west coast of Moresby island, and are very optimistic as to its future.

Numerous small individual properties at the south end of Moresby island are being worked and ore accumulated ready for future shipping.

On the north and east coast of Graham island the holders of placer-mining leases and prospectors continue active.

Active operations are in progress among the oil-shales of the west coast of Graham island; a large deal is said to be pending.

OFFICE STATISTICS—QUEEN CHARLOTTE MINING DIVISION.

Free miners' certificates issued	87
Mineral claims recorded (quartz)	43
Mineral claims recorded (placer)	1
Certificates of work issued	81
Bills of sale and records entered	10
Filings	4

Revenue.

Free miners' certificates	$ 390 50
Mining receipts	649 00
Trade licences	270 00
Firearm licences	105 00
General receipts (P.C.F.)	450 00
General receipts (V.S.)	50
Marriage licence	5 00
Total	$1,870 00

NORTH-EASTERN DISTRICT (No. 2).

Report by John D. Galloway, Resident Engineer.

GENERAL REMARKS.

Under the provisions of the "Mineral Survey and Development Act" of 1917, the four Mining Divisions of Omineca, Cariboo, Quesnel, and Peace River were made to constitute the North-eastern Mineral Survey District, with headquarters for the Resident Engineer at Hazelton. A general description of the geographic features of the district, together with a bibliography of all published reports on the geology and mining features of the district, is given in the Annual Report of the Minister of Mines for 1917.

The North-eastern District consists of the four Mining Divisions, as stated before, and these Divisions are subdivided for the purpose of this report as follows:—

Omineca Division—Skeena section; Hazelton section; Telkwa section; Sibola section.

Cariboo Division—Tete Jaune section; Fort George section; Ahbau Lake section; Barkerville section.

Quesnel Division—Quesnel section; Horsefly section; Keithley section.

During the first half of the year 1920 the mining industry made satisfactory progress in the North-eastern Mineral Survey District, but in the last half of the year a gradual decline set in. The year 1920 commenced with conditions favourable to the development of new mineral areas, but before the year had advanced far financial depression and the lowered market price of all the more important metals caused a curtailment in all mining development and production throughout the American continent. Considering these adverse conditions, the progress made in the North-eastern District during 1920 was satisfactory.

The production of the district for the year 1920 was slightly greater than in the preceding year. The output of silver, lead, and zinc for the district comes mainly from the *Silver Standard* mine at Hazelton, and this year this mine nearly doubled its shipments as compared with 1919. Practically no copper ore was mined in the district this year, but when an improvement in the copper market takes place some of the copper properties on Rocher Déboulé mountain and in other parts of the district should again make a production.

The placer-gold production, which comes almost entirely from the Cariboo and Quesnel Mining Divisions, was about the same as last year. Placer-mining in the Cariboo, Omineca, and Peace river seems to be about ready for a period of renewed activity during the next few years, as many prospective enterprises are about to be launched. The recent changes in the "Placer-mining Act" would seem to have been beneficial in encouraging development, and the impending era of lower prices, which automatically effects a higher relative price for gold, will undoubtedly stimulate the search for the yellow metal.

The following table shows the mineral production of the North-eastern Mineral Survey District for the year 1920, together with the corresponding figures for the year 1919:—

	1919.	1920.
Placer gold (oz.)	3,900	3,450
Lode gold (oz.)	147	218
Silver (oz.)	72,573	103,020
Lead (lb.)	180,455	189,488
Copper (lb.)	16,205	.....
Zinc (lb.)	224,539	453,512
Coal (tons)	1,752	1,400

It seems probable that the near future will see extended development of the coal areas of this district. The ever-increasing price of fuel-oil and its scarcity in the world's markets is causing renewed interest in all promising coalfields. The Telkwa river, Morice river, Zymoetz (or Copper river, as locally known), Peace river, and Groundhog fields have attracted attention this year and large-scale development may be expected before long. Undoubtedly these areas contain large quantities of good-grade coal, and but for the admitted transportation difficulties they might now be in the productive class. Some coal was mined by the Telkwa Collieries this

year and a short distance from this property a new seam is being opened up. This seam contains some high-grade blacksmith-coal and a small output will soon be marketed.

During the year grants were made from the Mines Development Fund to assist in building, improving, extending, or repairing a number of mining roads and trails in the district. Among the more important of such works were: Extensive repairs to the Cronin sleigh-road and the building of 1 mile of new road, linking this road up to the main road; extension from the McCabe trail on Driftwood creek to the *Victoria* group; extension from McCabe trail to the *Silver King* group; completion of Schufer trail on Hudson Bay mountain; trail from *Empire* group to Dahl Siding; continuation of work on Tahtsa River trail; extensive repairs to roads serving *Silver Standard* mine and mill; repair-work on the Manson–Fort St. James trail; laying-out of trail from Barkerville to Keithley Creek; repairs to Grouse Creek road; and a number of small grants where necessary.

Under the plan arranged by the British Columbia Department of Mines for assisting returned soldiers to prospect, five returned soldier prospecting parties were at work during the season in this district. Two parties examined country along the Skeena river, two parties were in the Peace River Division, and one party east of Ootsa lake. One party in the Peace River Division reported a successful season in finding some promising coal-seams, but no great success rewarded the efforts of the other parties.

OMINECA MINING DIVISION.

Skeena Section.

Usk.

In the vicinity of Usk there was a considerable amount of mining activity during the season. In addition to certain mining-work, there were quite a number of prospectors out in the hills.

Kitsalas Mountain Copper Co.

During the past four years this company has been developing the *Cordillera* group, situated 1 mile in a southerly direction from Usk. There are several quartz veins on the property which carry in places pay-shoots of bornite and some free gold. The property has been fully described in previous Annual Reports. The erection of a small concentrating-mill was practically completed in 1919, and during the summer of 1920 this mill was in operation for a time, with, it is claimed, satisfactory results. Ore from surface cuts was treated in the mill, but as yet no ore has been stoped from the underground workings. About 200 tons of ore was milled, producing about 20 tons of bornite concentrates, which, however, was not shipped during the year.

The milling machinery consists of a Blake jaw-crusher, Gibson grinder, amalgamating-plate, and a Wilfley table on which the tailings from the amalgamating-plate are concentrated. The ore is trammed from the mine-workings to the mill, 500 feet, on a covered-in surface tramway. The ore goes through grizzlies, the undersize going directly to the 150-ton ore-bin, and the oversize to the crusher which crushes to about ½-inch size, and then to the same ore-bin. From the ore-bin an automatic feeder discharges the ore into the Gibson grinder, where it is ground to about 20-mesh size.

The Gibson grinder consists, in effect, of a large pestle and mortar, the pestle being given a grinding motion by the swinging of the top of it through a circle about 2 feet in diameter, while pressure of the pestle on the mortar is given by its own weight together with the downward pull of a heavy spring. The rated capacity of the Gibson grinder is 30 tons in twenty-four hours. Mercury for amalgamating the free gold in the ore is put into the grinder and most of the amalgam is caught on baffles in the machine, the remainder being caught on the amalgamating-plate, over which the pulp from the grinder discharges. From the amalgamating-plate the pulp feeds directly to a Wilfley table, where the bornite content of the pulp is taken off as a concentrate and the tailings go to waste. No figures are available to show what extraction the mill as a whole makes.

There are on this property several quartz veins which are mineralized in places with bornite, chalcocite, copper carbonates, and varying amounts of free gold. The first development of the main vein on the property was an incline shaft 72 feet deep. After this a crosscut tunnel was driven to strike this main vein at a point some distance south-west of the shaft. This tunnel was driven a total distance of 412 feet and crosscuts the main vein at a point 360 feet in from the portal. The vein was then drifted on 90 feet to the west and 70 feet to the east. From the

Kitsalas Mountain Copper Co.'s Mill, Omineca M.D.

Silver Standard Mining Co.'s Concentrator, Omineca M.D.

east drift a 50-foot crosscut has been run into the hanging-wall and from the west drift a crosscut 17 feet in length.

At a point 125 feet from the portal of the crosscut tunnel a blind vein was encountered which showed from 2 to 3 feet of quartz well mineralized with bornite. This vein was drifted on westerly for a distance of 22 feet, and at this point a winze was put down 14 feet in depth. From the bottom of the winze a drift to the west has been driven for 70 feet. The workings on this blind vein show irregular mineralization of the quartz, with, in places, bands of good ore in which specks of free gold are quite frequently seen.

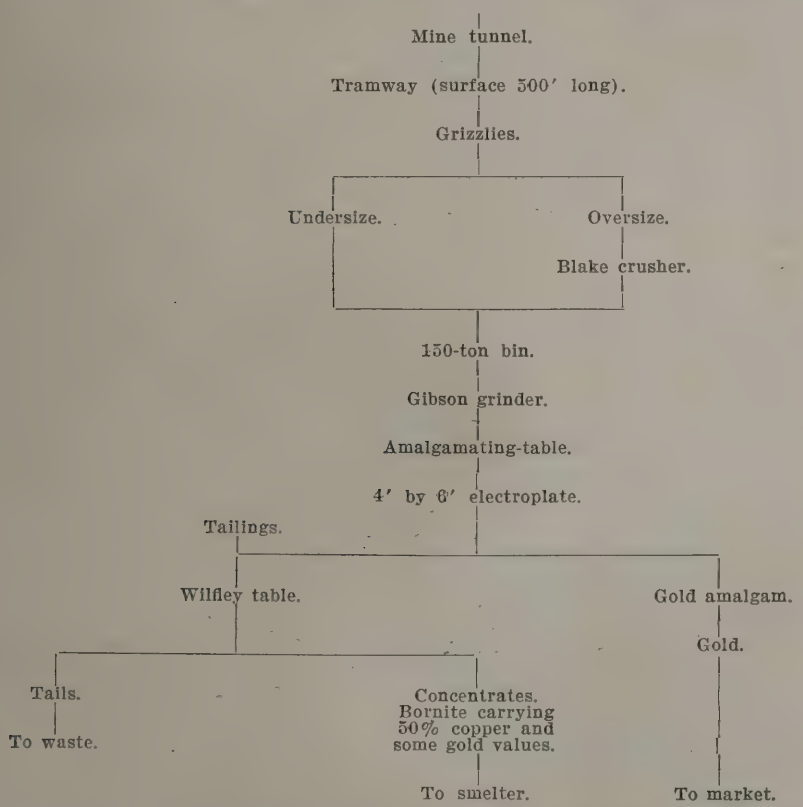
During the summer a short crosscut tunnel was driven to cut the main vein 110 feet to the north-east of the shaft. This tunnel is 46 feet long and shows the vein to have a width of about 4 feet, together with some parallel stringers in the walls. This tunnel-level is 36 feet below the bottom of the shaft on the dip of the vein.

Development of the mine was carried on during the summer with a force of from six to eight men under the superintendency of A. Thompson. Work was stopped in the fall, but will be resumed early in the spring. The ore apparently occurs in shoots with barren places between, so that considerable development will be required before much tonnage is blocked out.

The mill is housed in a good building, and there are, as well, a tool-house, blacksmith-shop, and concentrate-bin, and a fan-house at the mouth of the main tunnel. A covered tramway runs from this tunnel to the top of the mill building.

Accompanying this report is a diagramatic flow-sheet of the mill.

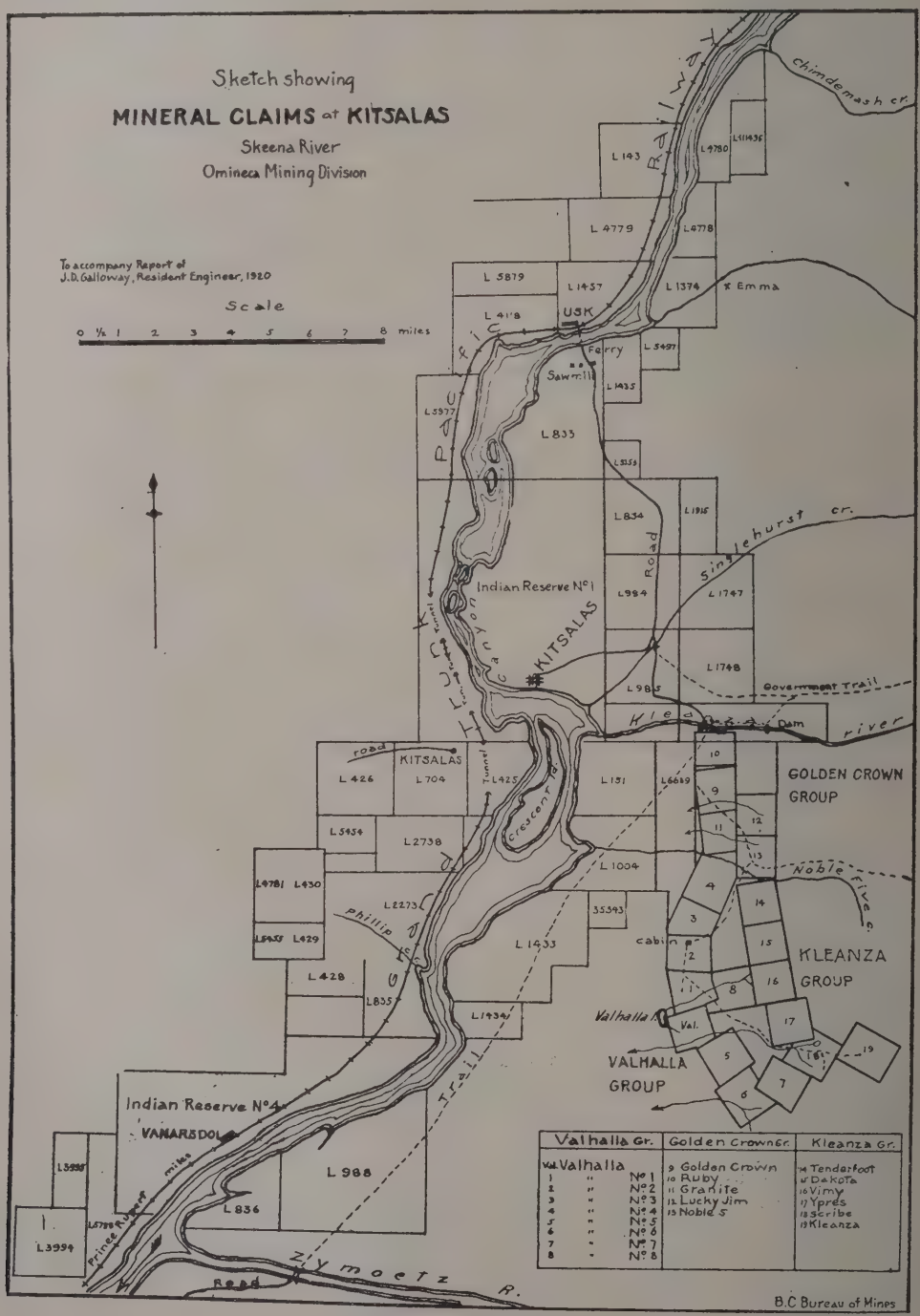
Kitsalas Mountain Copper Co. Flow-sheet of Mill.



Kleanza Co.

This company continued the work started last year of developing the *Golden Crown* group, which property is held under option. A number of claims contiguous to the *Golden Crown* group and extending to the top of Kleanza mountain have been located by the company. These are known as the *Valhalla* and *Kleanza* groups. On this part of Kleanza mountain covered by these various groups of claims there are

a large number of approximately parallel quartz veins; so far about twenty-seven distinct veins have been recognized. The country-rock of the mountain is granodiorite, and in this the quartz veins strike in a general north-westerly direction. Some of these veins are irregularly mineralized with pyrite, arsenopyrite, and small amounts of chalcopyrite. The important value in the ore is gold, which appears to be associated with the arsenopyrite and to some extent with the chalcopyrite. (*See* sketch.)



The *Golden Crown* group has been fully described in previous Annual Reports. The work this year by the Kleanza Company was mainly done on the *Valhalla* and *Kleanza* groups. This work consisted of stripping, open-cuts, and short tunnels to prospect certain of the quartz veins.

On the *Dakota* claim an open-cut 30 feet long with a 25-foot face exposes a well-mineralized vein from 1 to 3 feet wide. This vein strikes north-westerly and dips at about 45° to the north-east.

The exploration-work was stopped in the fall when bad weather commenced, but will be restarted early in 1921. It is the intention of the Kleanza Company to carry on extended development-work on several of the quartz veins with a view to proving a sufficient tonnage of ore to warrant the erection of a mill.

Kleanza Creek.

The trail to the head of Kleanza creek from Usk has been in bad shape for the last three years, so a start was made by the Public Works Department this summer to improve it. Six miles of new trail was laid out and about half of this was constructed. There are a number of properties in this section which should attract some attention, but owing in part to the bad trail little or nothing has been done on them. The showings consist of sheared and sheeted zones, giving rise to vein-like deposits, in which there are found copper minerals, principally chalcocite and bornite. The prevailing country-rocks consist of a series of volcanic rocks, diabase, andesite, basalt, and breccias, which are, as a rule, considerably metamorphosed. For a more extended account *see* the 1914 and 1917 Annual Reports.

Peerless Group. This group, owned by O. T. Lindland, J. D. Wells, and partners, lies at the head of Kleanza creek, about 20 miles from Usk. There are several showings on the property of high-grade chalcocite and bornite occurring irregularly in fissures. During the year a small amount of development was done, consisting of a large open-cut and the commencement of a tunnel. This work is on a vein striking north and south (mag.) and dipping at 75° to the west. This vein is really a sheared zone with a well-defined hanging-wall and an indefinite foot-wall, with the width of mineralized material varying from a few inches up to 3 or 4 feet On the hanging-wall bands of nearly solid chalcocite occur in places.

A sample across 2½ feet returned on assay: Gold, trace; silver, 0.8 oz.; copper, 4.1 per cent.; and a selected sample representative of hand-sorted ore gave: Gold, trace; silver, 6.2 oz.; copper, 19.2 per cent.

The showings on this property are sufficiently promising to warrant further development.

Lucky Jim Group. This group of claims, which is owned by Fred Forrest, of Usk, is situated near the 12-Mile post on the Kleanza Creek trail. These claims have been held for some years by the present owner, who developed one showing by means of a shaft and tunnel. This year he started work on a new showing situated about 1,000 feet from the main trail at the 12-Mile post. This showing consists of a sheared zone occurring in dark-coloured volcanic rock. The zone is from 5 to 8 feet wide and is mineralized with bornite and copper carbonates. The development consists of an open-cut on the vein 25 feet long with a 15-foot face. The vein strikes N. 25° W. (mag.), going up and down the hill, thus giving a good chance for development by means of a drift-tunnel. The gangue consists of altered wall rock and some quartz.

A sample taken across 5½ feet at the face of the cut returned on assay: Gold, trace; silver, trace; copper, 3.5 per cent. A grab sample of the whole dump from the open-cut, and intended to be an average, assayed: Gold, trace; silver, 3.2 oz.; copper, 8 per cent.

Considering the slight amount of development so far carried out, this showing is a promising one.

Other Properties.—Other properties in this section on which work was done during the year were the *Hazel* group, owned by J. D. Wells and partners, the *Continental* group, and the Baxendale property.

Legate Creek.

Early this spring a number of claims at the head of Legate creek were secured by option and purchase by the British Columbia Exploration Company, of Vancouver. The more important properties thus secured were the *M. & K.*, *M. & M.*, and *Independence* groups.

A number of men were employed for about two months, and, while but little actual development-work was done, a pretty thorough examination and sampling of all the properties

were made. K. D. Woodworth was in charge of the work and an assayer with the necessary equipment was kept busy during the summer at Pacific. Professor W. L. Uglow, of the University of British Columbia, spent a month or six weeks on the properties, examining and reporting for the company.

As a result of the summer's work certain options held by the company were dropped, but others were retained. It was intended at one time to proceed with development of the *M. & K.* and *M. & M.* properties this winter, but since stopping work in the fall nothing has been done and the future plans of the company are unknown.

All the properties secured under option by this company have been described in previous Annual Reports, so that extended descriptions of them are unnecessary.

The mineral-showings in this section are sufficiently promising to warrant much further attention being given to the camp than it has yet received. A number of the properties in this locality have well-defined quartz veins carrying good values in silver. Galena and tetrahedrite are the most important metallic minerals in these veins, the latter as a rule carrying high silver values.

Another type of deposit occurring in this section, as shown on the *M. & K.* and *Frisco* properties, consists of sheared zones in which the principal values are in bornite, chalcocite, and chalcopyrite, which, in addition to the copper content, carry some silver values. In the case of the *M. & K.* a peculiar ore is also found consisting of a fine-grained crystalline intergrowth of galena and bornite.

There is a good pack-trail from Pacific to the forks of Legate creek, a distance of 12 miles. The various properties are situated at distances of 1 to 3 miles from the forks of the creek and are connected by branch trails to the main trails. A wagon-road could easily be built up Legate creek, so that these properties are well located as regards transportation. Timber is plentiful and there is an abundance of water-power available.

HAZELTON SECTION.

Glen Mountain.

The *Silver Standard* concentrating-mill was operated from early in the spring until the end of October. The year's operations were satisfactory and a larger tonnage of ore was milled than in any previous year. It had been hoped that production would have been continued all winter, but the management decided that this would be inadvisable. The difficulty of marketing silver-zinc concentrates, the lowered market price for silver, and the recent excessive rise in freight rates were the factors which caused the decision to close down. Marketing conditions have reached the point where the best policy is to leave the ore in the ground. Doubtless these conditions are but temporary and a resumption of operations may be expected in the spring.

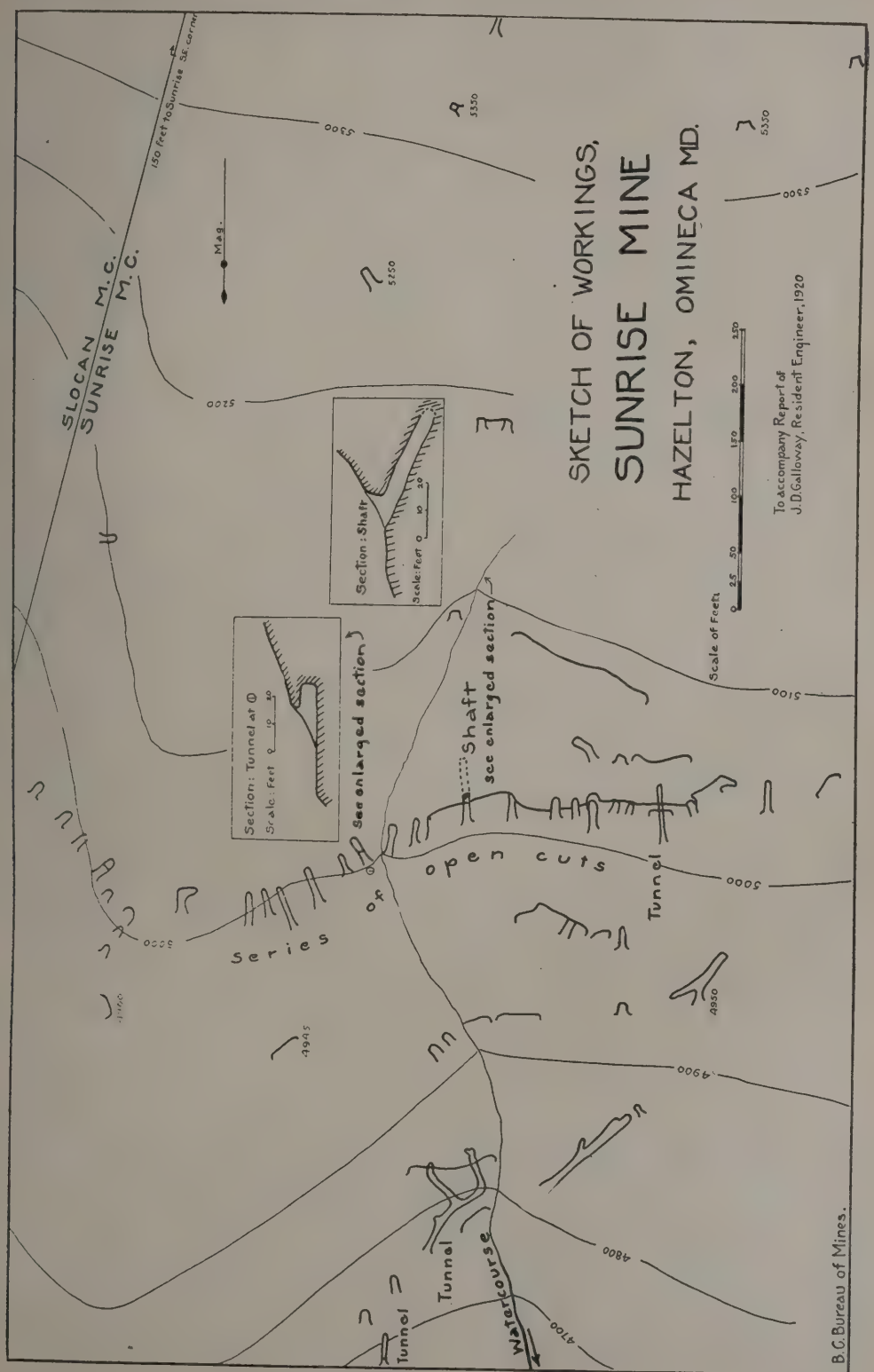
During last winter a low-level crosscut tunnel was started, and this work proceeded with but few interruptions until the mine was closed in October. This tunnel will cut all the veins at a considerable depth below the present workings and eventually will be the main entry of the mine. So far this tunnel has been driven about 1,000 feet and three veins have been cut by it and some stringers. The present objective of the tunnel is the No. 4 vein, which should be reached in a further distance of about 380 feet. This vein contained some excellent shoots of ore in the 250-foot crosscut-level workings, which are expected to continue at depth. Still farther ahead in the mountain lies the main vein, from which much good ore was extracted from the old shaft-workings and the 250-foot level.

The production for the year was 602 tons zinc concentrate and 279 tons lead concentrate, containing 218 oz. gold, 103,020 oz. silver, 189,488 lb. lead, and 453,512 lb. zinc. The tonnage of ore milled was about 4,000 tons.

The *Silver Standard* mine has been described in detail in several of the Annual Reports from 1911 to 1919, so that no extended description is necessary in this report. A plan showing all underground workings up to date is appended to this report.

Nine-mile Mountain.

There are a number of claims on the northern side of 9-Mile mountain which have showings of silver-lead ore; of these the *Sunrise* and *Silver Cup* are perhaps the best known. Nine-mile mountain at this point consists of a central core or boss of granodiorite which is intrusive into the sedimentary tuffs which form the main mass of the mountain.


SKETCH OF WORKINGS,
SUNRISE MINE
HAZELTON, OMINECA MD.
To accompany Report of
J.D.Galloway, Resident Engineer, 1920
Scale of Feet
0 25 50 100 150 200 250
SLOCAN M.C.
SUNRISE M.C.
150 Feet to Sunrise SE corner
Mag.
Section: Shaft
Scale: Feet 0 10 20
Section: Tunnel at ①
Scale: Feet 0 10 20
See enlarged section
See enlarged section
Shaft
see enlarged section
Series of open cuts
Tunnel
Tunnel
Tunnel
Watercourse
5300
5250
5200
5100
5000
4900
4800
4700
4930
4945
5330
B.C. Bureau of Mines.

The veins on these properties occur both in the sediments and in the granodiorite; in the former they consist of well-defined quartz-filled fissures varying from 1 to 4 feet in width; in the granodiorite the veins are of the sheared-zone type with mineralization spaced across 5 to 20 feet, with, in places, narrow bands of high-grade ore on the walls.

The mineralization in all these veins is similar. The metallic minerals in the order of their abundance are galena, jamesonite, zinc-blende, arsenopyrite, pyrite, and tetrahedrite. The gangue consists of quartz and calcite, together with in places, crushed and silicified granodiorite.

Sunrise Group. This group, which is owned by the Sunrise Mining Company, was secured under option late in 1919 by the American Smelting and Refining Company.

There are two well-defined mineralized zones on this property, occurring in granodiorite. The lower, which is at an elevation of 4,950 feet, strikes north-easterly and dips at 45° to the south-east. It has been slightly developed by open-cuts which show irregular mineralization across a width of 10 feet, and in places narrow bands of clean sulphides consisting mainly of galena and jamesonite. Surface cuts expose this zone at intervals for a distance of 300 feet.

The upper zone is at an elevation of 5,050 feet and has a width of from 4 to 8 feet. It strikes east and west (mag.) approximately and dips at 25° into the hill. It is a sheared zone apparently following one line of jointing in the granodiorite in which it occurs. The outcrop forms a nearly horizontal line along the mountain-side, continuing around a nose and outcropping again on the adjoining *Miller* property.

The mineral occurs in narrow stringers with granodiorite between, which carries in places some disseminated mineral content. The granodiorite forming the gangue of the zone is somewhat altered and in places quartz occurs as the gangue-filling.

All development-work by the American Smelting and Refining Company on the *Sunrise* was confined to the upper zone. This zone was stripped on the surface for some distance, and large open-cuts exposed the full width of the vein and were deep enough to get below the surface oxidation, thus enabling a systematic sampling of the vein to be made. An incline shaft was sunk on the vein to a depth of 40 feet. The whole vein was pretty thoroughly sampled by the engineer in charge of the work, Bert F. Smith, and an assay plan prepared. The assay results are not definitely known, but in the fall the company allowed its option to expire, the reason given being that the property did not give promise of producing a large tonnage of milling-ore. It is known that one shoot of ore 200 feet in length of satisfactory value was disclosed and that good ore occurs at the bottom of the shaft. It is probable that the property will be further developed by some one if an increase in the present market price of silver takes place.

Four-mile Mountain.

Four-mile mountain is situated about 4 miles north-east of Hazelton, just north of the Bulkley river, and is reached by a good wagon-road. It rises to 2,200 feet altitude, or 1,400 feet above the river. The mountain consists of a central core of granodiorite intrusive into sedimentary measures of the Hazelton formation.

A number of mineral claims have been staked on this mountain, the showings generally being at or near the contact of the granodiorite and the sediments. The ore occurs in quartz veins occupying sheared zones and striking from N. 10° E. to N. 45° E., with steep dips to the south-east. The minerals contained in these veins are galena, sphalerite, jamesonite, tetrahedrite, and pyrite. High silver values are carried in the ore, the silver being associated with the galena and tetrahedrite.

Erie Group. This group consists of four Crown-granted mineral claims and is owned by Thos. Kinman, of Vancouver. The property was first worked prior to 1914, since when no further work was done until the present year 1920. The main showing is a vein varying from 2 to 4 feet in width and occurring near a contact of granodiorite and sedimentary measures. The first workings consisted of two shafts, one about 50 feet deep and the other about 20 feet. From the 50-foot shaft workings a shipment of hand-sorted ore was taken out which returned high silver values, together with some lead content. At the bottom of the shaft the vein is said to be faulted. A crosscut tunnel was then started at a point so as to cut the vein below the bottom of the shaft. This tunnel was driven 200 feet when the work was stopped some years ago.

The continuation of the driving of this tunnel was started this summer, and before closing down for the winter the tunnel was in nearly 500 feet. According to surveys, the point reached by the tunnel now is approximately where the vein should be, but as yet the tunnel has not reached it. The vein, however, may be faulted so as to cause it to be still farther into the mountain. It is probable that further work will be done on this property next summer. Apparently the vein could be reached in a short distance from the crosscut tunnel either by driving ahead or by raising. The high-grade character of the ore makes it a reasonable speculation to carry out further development of this property. W. S. Harris was in charge of the work this summer with a crew of about six men.

Comet Group.

This group of three claims, situated on 4-Mile mountain, is distant about 6 miles from Hazelton. The owners are Tommy Stevenson and Jim Dyer. There are a number of veins and stringers on the property showing mineralization with zinc-blende, jamesonite, arsenopyrite, and galena. Shallow shafts, open-cuts, and some tunnelling constitute the development. The owners carry on a little work each summer and are at present driving ahead a tunnel. This tunnel was started as a crosscut, but is now following stringers of ore which are mainly sulphides of antimony, arsenic, and iron. These stringers may be feeders to a vein or may come together so as to become a good ore-shoot. These showings lie at and near the contact of the igneous and sedimentary rocks and are somewhat irregular.

Rocher Déboulé Mountain.

In December, 1919, work was recommenced on the property of the Delta Copper Company and was continued for a couple of months. The work was then stopped, but during the summer arrangements were made whereby a definite development programme was laid out. It was decided to carry out further development by means of diamond-drilling, and a contract was let to a Spokane firm to do this drilling. In September a drill was taken up to the property, and all arrangements made to start, when an early and heavy snowfall necessitated the stopping of the work until next spring. The Delta Copper Company owns the *Delta* group adjoining the property of the Rocher Déboulé Copper Company, also the *Chicago* group, and has control of the Highland Boy Company, owning the *Highland Boy* group. A full description of these properties and the operations of the Delta Copper Company can be found in the Annual Reports, 1914 to 1919.

There are a number of veins on these properties, but up to the present time only two have received much attention. These veins are similar in character to those of the Rocher Déboulé Company and one is believed to be an extension of the main (No. 4) vein of the *Rocher Déboulé* property. The valuable metallic mineral present is chalcopyrite, with which are associated magnetite, hæmatite, pyrite, tetrahedrite, and bornite. The gangue consists of hornblende, quartz, calcite, and crushed altered granodiorite. The main value in the ore is copper, but in addition small values in gold and silver are obtained. The veins are from 2 to 8 feet in width and carry in places shoots of good copper ore. As in the *Rocher Déboulé* veins, bands of nearly clean chalcopyrite occur.

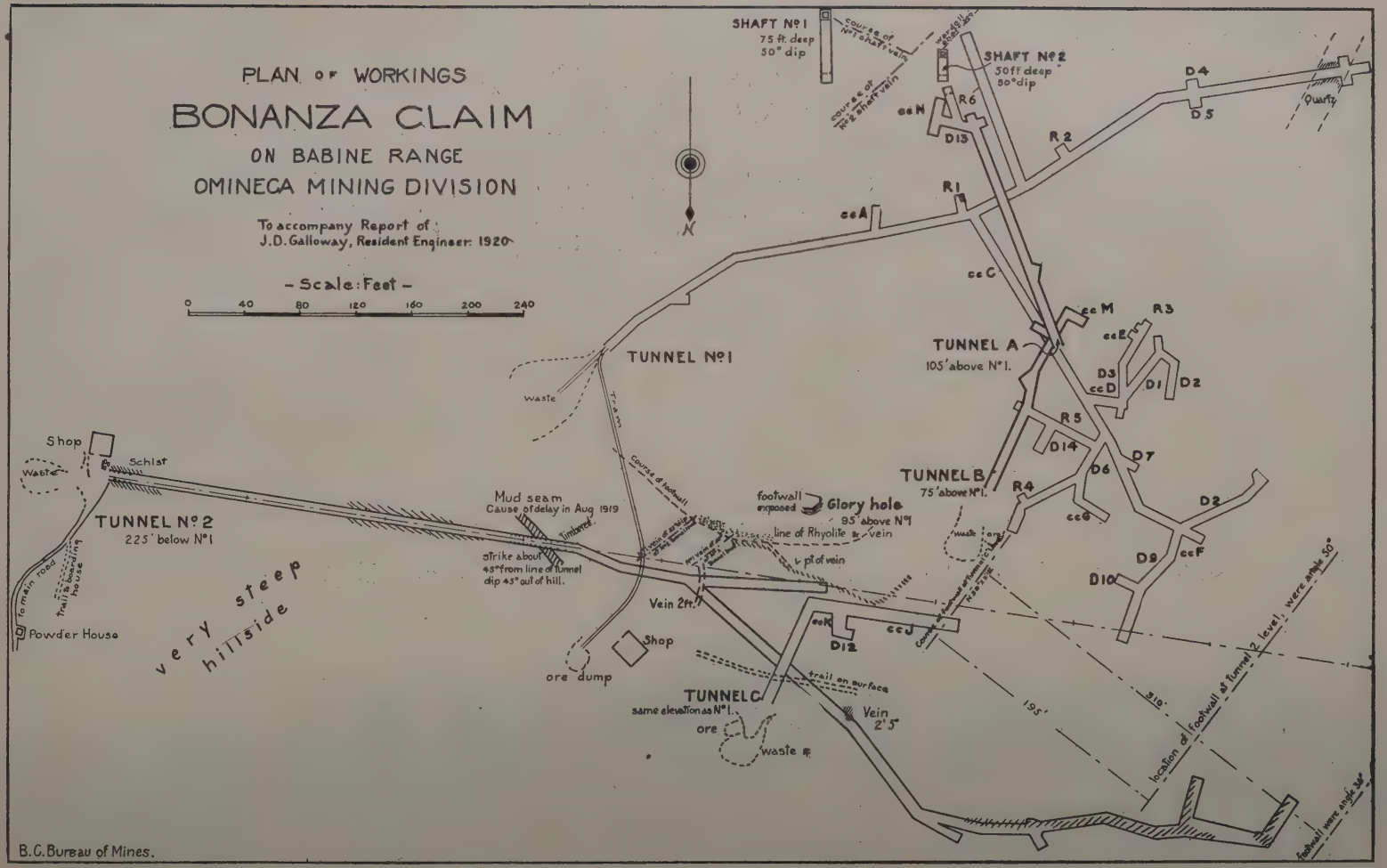
This property is so situated that use could be made of the tramway system of the Rocher Déboulé Company in transporting the ore to the railway.

Telkwa Section.

Babine Range.

Cronin's Mine.

The property of the Babine-Bonanza Mining and Milling Company, better known as Cronin's mine, was steadily developed during the year. For several years past the development of this property has been steadily proceeded with under the management of James Cronin, the principal stockholder in the company. This work had been successful in proving considerable tonnages of ore from the surface down to a depth of about 150 feet. In 1919 a long crosscut tunnel was started to tap the ore-bodies at a depth of 400 to 450 feet below the surface. This tunnel is now in about 1,000 feet and has been successful in striking one ore-body. Whether or not this is the main contact ore-body exposed in the upper workings is not yet definitely ascertained. The ore-body encountered has a width of 6 to 12 feet of good milling-ore, with many streaks of nearly solid sulphides. The ore is a


PLAN OF WORKINGS
BONANZA CLAIM
ON BABINE RANGE
OMINECA MINING DIVISION
To accompany Report of
J.D. Galloway, Resident Engineer. 1920
- Scale: Feet -
0 40 80 120 160 200 240
N
SHAFT No 1
75 ft. deep
50° dip
Course of No 1 shaft-vein
Course of No 2 shaft-vein
SHAFT No 2
50ff deep
50° dip
D4
D5
Quartz
R6
cc N
D13
R2
R1
cc A
cc G
cc M
R3
cc E
TUNNEL A
105' above No 1.
D3
cc D
D1
D2
R5
D14
D7
TUNNEL B
75' above No 1.
R4
D6
D2
cc B
D9
cc F
D10
TUNNEL No 1
waste
Tram
Course of footwall
Shop
Schist
Waste
TUNNEL No 2
225' below No 1
Mud seam
Cause of delay in Aug 1919
Timbered
strike about 45° from line of tunnel
dip 45° out of hill.
footwall exposed
Glory hole
95' above No 1
line of Rhyolite & vein
pt of vein
Vein 2ft.
Main road
Trail to boarding house
Powder House
very steep hillside
Shop
ore dump
cc K
D12
cc J
TUNNEL C
same elevation as No 1.
ore
waste
trail on surface
Vein 2'5"
195'
310'
location of footwall at tunnel 2 level, were at angle 50°
footwall were at angle 34°
B.C. Bureau of Mines.

PLAN OF WORKINGS

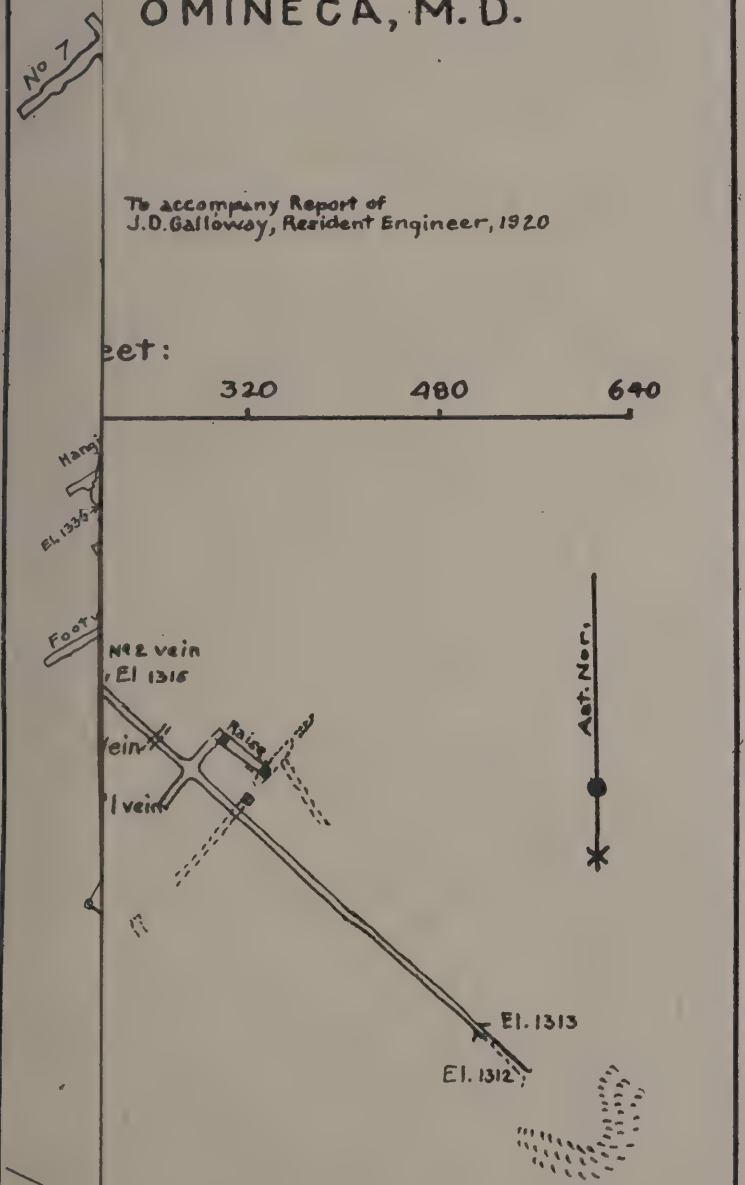
ER STANDARD MINE

OMINECA, M.D.

To accompany Report of
J.D. Galloway, Resident Engineer, 1920

eet:

320 480 640



B.C. Bureau of Mines

PLAN OF WORKINGS

SILVER STANDARD MINE

OMINECA, M.D.

To accompany Report of
J.D. Galloway, Resident Engineer, 1920

Scale of Feet:
0 40 80 160 320 480 640

Tunnel

No 7 Vein
No 7 vein outcrop
Main vein
Hanging wall vein
El. 1336
Stope
Footwall vein
Stopes
Outcrop FW vein
Collar of Shaft
El. 1730
H.W. Vein
El. 1730
Main vein
No 6 vein
No 6 Vein outcrop
No 5 vein
Projected position No 4
No 4 vein
Stope
No 4 vein outcrop
No 4
N.E. Cor L2262
Silver Standard, M.C.
No 3 vein
El. 1511
Blacksmith shop
No 8 vein outcrop
Vein 12" ore
No 2 vein
El 1315
Vein
No 1 vein
Raise
Ore bins
Powerhouse
Garage
Warehouse
El. 1313
El. 1312
Ast. Nor.
Office
N.W. Cor L2263 Skagway

B.C. Bureau of Mines

mixture of galena and zinc-blende occurring in a quartzose gangue and carries from 1½ to 2 oz. of silver to the unit of lead. The last part of the tunnel is a drift on the ore-body, showing it to be continuous for 200 feet or more.

Work was stopped for the winter about the end of the year, but next spring the question of equipping the property with a power plant, tramway, and concentrating-mill will be considered, as Mr. Cronin now considers that the mine has passed the prospect stage.

Detail descriptions of this property can be found in the 1914, 1917, and 1918 Annual Reports. The property is situated some 30 miles from the town of Telkwa, to which it is connected by a good sleigh-road. This road goes through a low pass in the Babine range at the head of Canyon creek, and has practically a level grade all the way to a point within 3 miles of the mine. From this point a series of switchbacks on a 14-per-cent. grade carry the road to the mine. Eventually the concentrating-mill will be situated some distance below the mine, to which it will be connected by aerial tramway, and from the mill an approximately level road will be obtained to Telkwa, the shipping-point on the railway.

Accompanying this report is a plan showing the important workings of the property. Tunnel No. 1 was first driven as a drift-tunnel, developing a 4-foot quartz vein which in places carried good shoots of galena and zinc-blende. Later the contact ore-body which outcrops on the surface was partially developed by tunnels A and B. Crosscuts were then run from tunnel No. 1 to explore the contact ore-body, and finally tunnel C, which is on the same level as No. 1, was driven.

These workings demonstrated that there was a considerable ore-body lying either in or near the plunging contact of the intrusive igneous rock with the black schist. This igneous rock is a rhyolite, in places being sufficiently coarse-grained to become a granodiorite. As a rule the ore is developed in the rhyolite rather than in the schist. The No. 2 crosscut tunnel was commenced in 1919, and during the present year, 1920, work on it was carried on nearly continually.

Silver King Group.

This group of eight claims is situated at the head of Driftwood creek and distant some 19 miles from Smithers. The first 12 miles is wagon-road and the remainder is good pack-trail. The group extends easterly from the head of the creek to where it adjoins claims of the *Babine-Bonanza* group. The property is owned by Patrick J. Higgins and partner. In November, 1919, a Seattle syndicate secured an option on the property and commenced work in a small way, which was continued until May, 1920. During the summer a reorganization of the syndicate was effected and the Steamship Mining Company was formed to take over the rights of the original syndicate. It was expected that work would then be resumed on the property, but up to the end of the year nothing was done. Unless further development is soon commenced the option on the property will expire. S. A. D. Davis was in charge of the work and had an interest in the original syndicate.

The main showing on the property is a quartz vein occurring in a rhyolite porphyry, and striking N. 70° E. (mag.) and dipping northerly at 60°. The vein is exposed in the rocky walls of a small canyon on both sides of Driftwood creek, which at this point is quite small. The width of quartz varies from a few inches up to 3 feet. It is mineralized with galena, zinc-blende, and grey-copper. Occasional specimens are obtained carrying native silver and silver sulphides. The quartz as a whole is fairly well mineralized with metallic minerals.

The original development by the owners consisted of a drift-tunnel on the east side of the creek 30 feet in length and one on the west side 10 feet long. The work done by the syndicate consisted of driving ahead the east tunnel to a total distance of 100 feet.

A sample taken across 15 inches of the vein at a point 10 feet from the face of the tunnel assayed: Gold, 0.12 oz.; silver, 81.6 oz.; lead, 7 per cent.; copper, 2.2 per cent. Another sample across 18 inches at a point 30 feet from the face of the tunnel gave: Gold, 0.22 oz.; silver, 168 oz.; lead, 10 per cent.; copper, 5.5 per cent.

Other Properties.—During the last two years several groups of claims have been staked in this locality. Most of them show ore carrying values in silver and copper. Little development has been done on any of these properties, but the high-grade ore occurring on them should make them worth investigating. The Kelly & Carson properties are typical of these new locations.

Hudson Bay Mountain.

There was not a great deal of mining activity on Hudson Bay mountain this year, but it seems possible that certain propositions that were under negotiation this year will go ahead in 1921. Among these are the *Aldrich*, *Carroll*, and *McLean* properties, on which deals are pending.

Empire Group. This group, consisting of the *Empire*, *Highgrade*, and *Timber* claims, is situated 6 miles from Smithers in a basin at the head of the South fork of Simpson creek, on the easterly side of Hudson Bay mountain. The owner of the property is Donald Simpson, of Smithers. The main showing is a small but well-defined vein striking N. 75° W. (mag.) and dipping north-easterly at about 60°. The country-rock is mainly andesitic breccia, both purple and green-coloured varieties being noted.

The metallic minerals present in the vein are galena, zinc-blende, and iron pyrite. The gangue consists of altered wall-rock together with some quartz. The vein varies in width from 6 to 12 inches, and there are subsidiary parallel quartz stringers in the hanging-wall. Assays show the ore to carry about 1 oz. silver to the unit of lead. A grab sample of roughly hand-sorted ore assayed: Gold, 0.04 oz.; silver, 39 oz.; lead, 41.5 per cent.; zinc, 20 per cent.

Schufer Property.—Further development of this property was carried out by the owners during the year, with satisfactory results, but no ore was shipped. The completion of a good wide trail to this property this year should enable the owners to make ore shipments in 1921.

Cassiar Crown Copper Company.

Small-scale operations were carried on by this company for eight months in the year, the work being stopped in November. The property is situated on Grouse mountain, 18 miles south-easterly from Telkwa. This company has done a considerable amount of development-work on its property since acquiring it in 1914. The details of this work can be found in the Annual Reports for 1914 and the following years. One hundred feet of drifting was done this year on the *Ruby* claim. No ore was shipped.

Telkwa River.

There are a number of claims situated near the headwaters of the Telkwa river which have been held for some years; some of these claims are Crown-granted, while others are held by annual assessment. Two properties were developed to some extent during the summer—namely, the *Big Four* group and the *Surprise* group.

These claims are situated about 35 miles from the town of Telkwa; the first 15 miles is by wagon-road to the forks of the Telkwa river and the remainder by pack-trail. The properties lie short distances beyond the junction of Milk creek and the main stream. The main trail up the Telkwa river is in fair condition, but some of the old corduroying needs renewing, as these places are now bad mud-holes.

Big Four Group. This property is situated about 2 miles by trail from the junction of Milk creek and the Telkwa river (at this point the main stream is quite small), on Goodwill mountain, at an elevation of 3,500 feet. The owners are the Chisholm Bros. and partners. A new trail was built to the property this year from the main Telkwa River trail, which owing to a better grade makes the climb from the valley to the showings much easier. The showings are situated below timber-line and overlook the main valley of the Telkwa. The present owners acquired the property last year and since then have erected a good cabin, sunk a 60-foot incline shaft, and made a number of open-cuts and surface-stripping.

The formation as exposed on the property consists of a light-coloured, fine-grained granitic rock, in places approaching a felsite and in others being a granodiorite. In this formation one or more quartz veins outcrop. The various quartz-croppings which occur at different points within a radius of 500 feet may be parts of the same vein which are disconnected by faulting, or there may be more than one vein. There are several showings of quartz, more or less mineralized and of considerable size, exposed in shallow cuts. If the ore-body is a definite vein, as would seem apparent, then it is faulted and probably cut by several dykes.

The metallic minerals which occur in the quartz are galena, chalcopyrite, and pyrite. Assays show that the galena is low in silver content and that the iron and copper sulphides only contain small amounts of gold. The unmineralized quartz contains no gold or silver values.

An incline shaft has been sunk 60 feet on a quartz-outcrop which at the surface is from 3 to 4 feet wide. At the time of examination there was water in this shaft, so that the working

could not be examined. The dump from the shaft does not show as much quartz as would be expected, so that apparently the shaft does not follow the vein closely or else the vein pinches somewhat. The quartz from this vein is rather sparingly mineralized with pyrite and chalcopyrite. A grab sample from the dump on assay only showed small amounts of gold and silver.

One hundred feet above the shaft there are several outcroppings of quartz which look considerably more promising than the shaft-workings. On one of these a large open-cut has been made which shows a width of 6 to 8 feet of well-mineralized quartz. A grab sample of the ore from this cut assayed: Gold, 0.20 oz.; silver, 3.6 oz.; lead, 18 per cent.; copper, 1.6 per cent. This ore, in addition to galena and pyrite, carries some chalcopyrite.

Another cut a short distance below the one last mentioned shows a 4-foot vein, an average sample of which assayed: Gold, trace; silver, 4 oz.; lead, 24 per cent.; copper, 9.7 per cent.

The indications are that this property may have an ore-body of considerable size of milling grade.

Surprise Group. This group, consisting of the *Morning Star*, *New York*, *Surprise*, and *Maple Leaf* claims, is owned by Sam Bush and Louis Schorn. It is situated on a mountain lying on the north side of Milk creek and the showings are all above timber-line. The formation as exposed on these claims consists of volcanic rocks, the prevailing types being red and green andesites. Outcropping on these claims are a number of quartz veins which are irregularly mineralized with galena, grey-copper, chalcopyrite, pyrite, arsenopyrite, and copper carbonates.

On the *Morning Star* claim one vein is developed by a 12-foot shaft and some open-cuts. The width of quartz is from 6 inches to 2 feet and in places it is well mineralized with sulphides. From the quartz taken out of the workings twenty-eight sacks of ore had been hand-sorted; a grab sample of this assayed: Gold, 0.42 oz.; silver, 322.6 oz.; lead, 26 per cent.; copper, 12 per cent.

On the *New York* claim there are three quartz veins which are roughly parallel, striking east and west along the mountain-side and separated by 700 to 800 feet. The lowest vein is from 2 to 4 feet wide and somewhat broken by faulting. The quartz is not particularly well mineralized, but in places carries bands of galena and arsenopyrite. A sample across 2 feet of the vein assayed: Gold, trace; silver, 12 oz.; lead, 12 per cent. Another sample of selected galena returned on assay: Gold, trace; silver, 28.4 oz.; lead, 48 per cent. A sample taken across 3 feet, which showed a little arsenopyrite, assayed: Gold, 0.22 oz.; silver, 10.5 oz. to the ton.

The main showing on the *New York* claim lies about 500 feet up the mountain from the last-mentioned vein. It consists of a very well-defined quartz-filled fissure which crops out along the hillside for several hundred feet. This vein has a general east-and-west strike (mag.) and dips northerly into the hill at an angle of about 33°. The width of quartz between walls varies from 1 to 3 feet. The metallic minerals present in the quartz are galena, arsenopyrite, grey-copper, chalcopyrite, and small amounts of native silver. These minerals occur as a rule in a pay-streak a few inches wide on the footwall side of the vein. The country-rock enclosing the vein is a dark-coloured volcanic rock of the nature of a diabase. During the summer an incline shaft was sunk on this vein to a depth of 45 feet and some surface cuts were made along the outcrop.

A sample taken across 2 feet near the top of the incline returned on assay: Gold, 0.16 oz.; silver, 24 oz.; lead, trace; copper, 0.3 per cent. Selected ore from the vein assayed: Gold, 0.14 oz.; silver, 67.8 oz.; lead, 21 per cent.; copper, 0.6 per cent. A grab sample of the ore-dump gave: Gold, 0.16 oz.; silver, 15 oz.; lead, 4 per cent.; copper, 0.3 per cent.

Telkwa Collieries.

The coal-mine of the Telkwa Collieries was worked with a small force of men during most of the year, the shipments of coal amounting to about 1,400 tons. During the year the company leased the property to J. M. Gillespie, who has been manager for the company for the past two years.

The method of handling this coal has been by wagon-haulage from the mine to a bunker on the railway at Telkwa, a distance of 4½ miles. During the summer the Grand Trunk Pacific Railway put a steam-shovel at work extending the yard at Telkwa, and in the course of this

work the coal-shipping bunker was taken down, and up to the end of the year had not been replaced. This prevented shipments of coal to Prince Rupert or other points on the railway. It is expected that when the bunker is replaced regular shipments will be commenced again. Detail descriptions of the coal-measures in this locality and the workings of the Telkwa Collieries can be found in the 1918 and other Annual Reports.

Mr. Gillespie also has a lease on the Aveling coal property, which is situated about 6 miles up the Telkwa river from the town of Telkwa and about 2 miles distant from the property of the Telkwa Collieries. Arrangements have been made to open up a seam of coal on the Aveling property and mining was commenced about the end of the year. Part of this seam contains a band of high-grade blacksmith-coal, and it is the intention to mine and ship this. By submitting samples to Vancouver, orders have already been received for car-load shipments of this blacksmith-coal, and it is hoped that a considerable market for this class of coal can be secured. Analyses of this coal show it to be low in ash and high in fixed carbon.

Zymoetz River Coalfield.

In 1914 the writer examined the coalfield lying on Chettleburgh creek, a tributary of the Zymoetz river, and distant about 40 miles from Telkwa. There are two good seams of coal exposed at this place, respectively 9 and 6 feet in thickness, which are slightly developed by short prospect-tunnels. The coal-measures are exposed up and down Chettleburgh creek for 2 miles, but owing to concealment of the rock formation by surface wash the other dimensions of the basin are not known.

The property, consisting of some twenty sections, is owned by the Copper River Coal Company. The National Finance Company, now in liquidation, handled the property as fiscal agents until 1914. The property is now being handled by the Yorkshire and Canadian Trust, Limited, Vancouver, liquidators of the National Finance Company. In the 1914 Annual Report the writer gave a complete description of this field, with sections, analyses, etc.; to this report the reader is referred, as there is nothing further to record since that time.

A diamond-drill was taken in to the property during the winter of 1913, but has never been used, all work having been stopped since 1914.

Diamond-drilling on this property is the easiest and cheapest way in which this coalfield can be prospected and tested. The present showings are of sufficient promise and importance to warrant the expenditure necessary for drilling, as a reasonable speculation for anybody desirous of securing a supply of coal. It must, of course, be remembered that a railway 35 to 40 miles long is a necessity for opening up this coalfield, and it is obvious that the existence of a large tonnage of coal of commercial grade must first be proven before the construction of such a railway can be considered.

About the end of the year an option on this property was obtained by A. C. Garde from the liquidators. It is known that one condition of the option is that diamond-drilling of the property is to be started in the spring of 1921. If this work is carried out the value of this coalfield should be definitely determined.

SIBOLA SECTION.

There was no mining activity in this section during 1920, but a number of prospectors were busy in the hills and some new finds have been reported. The *Emerald* group on Sweeney mountain and the *Silver Tip* group on Whitesail lake, which were under development in 1919, were not worked during the present year. These properties have promising showings of silver-lead ore and undoubtedly will attract attention in the future. The question of transportation is difficult but not insurmountable.

A geologic reconnaissance of the country around Whitesail and Eutsuk lakes was made during the season by a party of the Geological Survey of Canada, the party being under the guidance of R. W. Brock.

TALTAPIN MINING COMPANY.

Introductory.—The Taltapin Mining Company is a company organized in 1919 for the purpose of developing and operating certain mineral property situated north of Burns Lake, a town on the Grand Trunk Pacific Railway. Vancouver capital was interested in the project and the

head office of the company is in Vancouver. A. Wallace is President of the company and A. Wood is managing director.

Development-work and necessary construction-work was started late in 1919 and carried on until May, 1920, when operations were suspended until the fall. Mr. Wood has been actively in charge of the work at the property and a small force of men was put to work in November, with the intention of continuing development all winter.

Location.—The mineral property which is being developed by the Taltapin Mining Company consists of the *Silver Fox* claim and six other adjoining claims. The *Silver Fox* claim is held under option of purchase from the owner, Charles S. Anderson, and is a Crown-granted mineral claim. The six other claims were staked for the company last fall.

The property is distant from Burns Lake about 25 miles in a northerly direction. The rough wagon-road from Burns Lake to Babine lake is followed for 12 miles to a point known as the Half-way. From this point a sleigh-road was built last fall to the property, a further distance of about 13 miles. The whole road can be classed as a sleigh-road, although light loads can be taken in by wagon in the summer-time when the road is dry. The spring of the year is the bad time, as the conditions are not suitable either for sleighing or wheeling. The principal showings are on the *Silver Fox* claim and they outcrop along the walls of a canyon formed by Anderson creek. All work by the company has been confined to the development of these showings. The elevation of the property is about 2,600 feet, or only slightly higher than Burns Lake, which is 2,300 feet. Anderson creek is a good-sized stream and in the spring of the year is a raging torrent.

Geology.—The rock formations on this property are well exposed in the canyon of Anderson creek, and this is the only point at which they were examined. The prevailing rock is a light-coloured greyish-green andesite which has been considerably altered by metamorphic action. The original hornblende has been very largely altered to chlorite; the feldspars, however, show but little alteration. This andesitic rock is not homogeneous throughout, but shows variations in texture and basicity, and it would appear that the formation is made up of successive flows which, while differing somewhat in composition, are of the same rock type.

A wide band of white siliceous rock occurs near the centre of the canyon, which is locally called quartzite. While in places this rock bears a strong resemblance to quartzite, it will probably be found to be a highly siliceous volcanic rock of the nature of an aplite or felsite. It is apparently contemporaneous in origin with the andesite formation. The andesitic formation has a general strike of north-east and south-west, with a flat dip to the north-west.

There are a number of fairly well-defined quartz veins, which crop out on the walls of the canyon of Anderson creek and usually strike and dip with the formation.

Description of Veins.—Anderson creek where it forms a canyon on the *Silver Fox* claim runs roughly north and south. The canyon is about 75 feet deep, with steep walls, which in many places are perpendicular. East of the creek the country gradually rises, but to the west the country is rolling, with no appreciable gain in elevation. The quartz veins which are exposed by the canyon cut across Anderson creek at varying angles from 45° to 90°. In a distance of 800 feet up and down the canyon there are half a dozen or more stringers and veins of quartz which vary in width from a few inches up to 6 feet. These veins have a general strike of north-east and dip at angles of 30° to 60° to the north-west. They are broken up somewhat by small faults and slips. The metallic minerals noted in the veins are galena, sphalerite, chalcopyrite, arsenopyrite, pyrite, and tetrahedrite. In most places these minerals only occur in small amounts, the total percentage of metallic minerals to quartz being quite low. Surface oxidation is apparent in places, but is an unimportant feature.

The most important showing in the property is what is known as the "High-grade vein." This vein, where it is exposed on the east side of the canyon, has a strike of N. 30° E. and dips at 60° to the north-west. It also crops out in the bed of the creek and at the foot of a vertical bluff on the west side of the creek. It is at this latter place that there is said to be a considerable showing of high-grade ore, but unfortunately it was quite impossible to examine this showing when the property was visited. Work was done on this showing last winter, when the creek was at low water and frozen over, a hole 6 feet deep being sunk. At the present time this hole is nearly filled with rock which has fallen in and it is covered by the water of the creek. The original owner had a ladder down the bluff on the west side, but this was blown away in the work done last winter, so that it is impossible to even get near the showing.

On the east bank of the creek the "High-grade vein" shows from 6 inches to 2 feet of quartz which is very sparingly mineralized with galena and pyrite. The lead is not sufficiently exposed at this point to admit of proper sampling. There it was observed this "High-grade vein" does not differ markedly from any of the others, but Mr. Wood says that in the hole in the bed of the creek this vein shows from 4 to 5 feet in width of good-grade ore.

At a point about 200 feet down the creek from the outcrop of the "High-grade vein" there are three bands of quartz or veins which strike north-easterly and dip at an angle of 30° to 45° to the north-west. These three bands are separated from one another by from 10 to 20 feet of rock-matter and vary in width from 1 to 4 feet. They are very sparingly mineralized with galena, sphalerite, and arsenopyrite, and some oxidation products therefrom.

On the west side of the canyon a tunnel had been driven in on the central band by Anderson. Last winter a tunnel was driven by Wood, which starts 40 feet north of the Anderson tunnel and goes in at right angles to the creek. The Anderson tunnel curves to the north and is now connected through to the Wood tunnel, which latter is about 100 feet long. Both these tunnels crosscut the vein obliquely and pass into the foot-wall. The central quartz-band as exposed by this work is from 2 to 3 feet wide and sparingly mineralized. Mr. Wood considers that the "High-grade vein" and the "Tunnel vein" intersect, and from their apparent strikes they may. He therefore plans to sink from the end of the tunnel and then crosscut for this intersection, where he anticipates finding good ore. He considers that it is quite impracticable to develop the "High-grade vein" from the point where the good showing of ore occurs. By his method he will develop both the "High-grade vein" and the three bands forming the "Tunnel vein."

Values.—High values are said to be obtained from the main showing in the "High-grade vein," Mr. Wood having assays showing up to about 1,000 oz. in silver to the ton, besides lesser values in gold, lead, and copper. Presumably these are from specially selected specimens. From the hole sunk on the "High-grade vein" near the bed of the creek last winter 3 tons of ore were hand-sorted, hauled out to Burns Lake, and shipped to the Trail smelter. The returns from this shipment have not yet been received, but Mr. Wood expects the shipment to run about $300 a ton.

No systematic sampling of the other veins has been done and the random samples taken would indicate the ore to be of low grade, but possibly with sufficient values for milling.

Work done.—The work done by the Taltapin Mining Company last winter and spring was as follows: Repairs to the Babine Lake road and the construction of 13 miles of sleigh-road from the Half-way to the camp at the property and to the showings, which are situated about 800 feet from the camp; erection of substantial bunk-house, cook-house, stable, blacksmith-shop, powder-house, and stable at the Half-way; two good wagon-bridges were put across Anderson creek, one at the camp and the other at the tunnel; 150 feet of cribbing was put in along Anderson creek where the tunnel was commenced; 100 feet of tunnelling and large open-cut at water-level on "High-grade vein." All work was done in a thorough manner and all construction-work was well done.

A gasolene-driven hoist was taken into the property last spring and will be erected at the end of the tunnel for sinking a winze to a depth of 100 feet. Machinery for an air-compressor plant has been purchased and was at Burns Lake ready for hauling in by sleighs in the winter.

Summary and Conclusions.—The *Silver Fox* claim, which is under option to the Taltapin Mining Company, is as yet an undeveloped and unproven prospect. There are on it a number of quartz veins which are more or less mineralized with silver-lead minerals, and one showing, which unfortunately could not be examined, which is reported to be a very promising one. This showing is so situated that it is rather difficult to attack it directly and the method which is planned may prove rather expensive.

The work which is now planned, if carried through, should test out pretty thoroughly the three bands of quartz forming the "Tunnel vein."

A careful plat of all the quartz-outcrops would be useful, and if, as well, all such outcrops were systematically sampled and assay plan made up a fair idea could be obtained whether or not these showings would stand up to milling grade.

CARIBOO MINING DIVISION.

Tete Jaune Section.

The Mica Syndicate.

Introductory.—The Mica Syndicate is a mining partnership formed in Calgary for the purpose of acquiring and developing certain mica claims situated near Tete Jaune: the members of the syndicate are Albert Johnson, I. Nollet, A. Allen, S. E. Beveridge, T. Wilson, and four others.

The *Reliance* claim, which has been owned by T. Wilson for some years, has been obtained by the syndicate and five other claims have been staked. The main showings are on the *Reliance* claim. Some adjoining Crown-granted claims are held by New York interests.

Work was commenced by the syndicate on May 25th, 1920, and for the most of the summer consisted of road and trail construction and the building of camps. It was hoped that actual development of the property would be commenced in September, but with the arrival of snow at that time the work was stopped for the winter.

S. E. Beveridge is in charge of the work for the syndicate, and during the summer from five to eight men have been employed.

Location.—The mineral claims comprising this property are situated on the northern slope of that portion of Mica mountain locally called "Nigger's Nob" and are distant from Tete Jaune, a station on the Grand Trunk Pacific Railway, about 7 miles. Tete Jaune is 184 miles east of Prince George.

A wagon-road which was built this summer by the Mica Syndicate leaves the railway a short distance east of the Sand Creek bridge, which is 2 miles east of Tete Jaune Station, and extends 4 miles towards the base of Mica mountain. This road connects with a road running from Tete Jaune to Swift Creek, on the Canadian National Railway. At the end of this road two large and well-constructed log buildings have been erected, which form a good headquarters camp.

From this point a good trail on an even grade has been built up the mountain to the showings on the *Reliance* claim, a distance of about 3 miles. The elevation of the showings is about 6,000 feet, with timber-line at about 5,000 feet.

Geologic Features.—The dominating rock of Mica mountain is a coarse-grained garnetiferous mica-schist which has been classified by the Geological Survey as highly metamorphosed sedimentary material and provisionally placed in the Shuswap group of the Pre-Cambrian.

These schists have been intruded by granitic rocks which vary from normal granodiorite to pegmatite. The pegmatite dykes, of which there are a number cutting through the mountain, are important, as they are the source of the mica that is obtained. These dykes vary in width from a few feet up to 100 feet. They are approximately parallel in strike, having a trend of north-west and south-east. The dip is to the south-west at from 30° to 40°.

The essential minerals in these pegmatite dykes are quartz, feldspar, and muscovite mica, and in addition small quantities of accessory minerals such as garnet, tourmaline, cyanite, beryl, and apatite. The dykes vary greatly in texture, and only in certain bands, generally only a few feet wide, are the essential minerals segregated into large crystals or masses. It is in these bands that mica "books" are large enough to be of commercial value. Other parts of the dykes generally consist of a coarse-grained intergrowth of quartz, feldspar, and mica. As a rule the dykes seem to have a relatively small feldspar content, but have an excess of quartz.

The mica found in these pegmatite dykes is the variety known as muscovite. It is transparent and, in thin flakes, is almost white in colour with a slight greenish tint. It is generally twinned, very few single crystals being noted. Only surface samples of the mica can be obtained at present and these as a rule are somewhat rusty in appearance. This is probably due to surface oxidation and weathering, and it is expected that much cleaner mica will be obtained at a little depth, where the surface weathering would not have affected it.

The Mica Syndicate has submitted samples of this mica to many experts and mica-buyers, and claim to have had favourable reports, and that several concerns are prepared to purchase this mica in a rough dressed condition when shipments can be made.

In the bands of the dykes where the essential minerals are well segregated the mica crystals are well developed and often attain considerable size. Crystals or "books" ranging from

4 by 4 to 12 by 12 inches occur abundantly, and still larger are found. These crystals have a thickness of ½ inch up to 2 inches. These crystals have an excellent basal cleavage and are easily split into as fine flakes as is desired.

Development.—Very little development-work has been done on these claims. On the *Reliance* claim there is one large open-cut and a few small holes which expose a pegmatite dyke, but the greatest depth attained is not more than 5 feet. This dyke carries considerable mica and the open-cut shows a band from 3 to 4 feet wide in which large "books" of mica occur. On either side of this band there is finer-grained material in which the crystals of mica are about 1 square inch in size.

When the property was visited at the end of August the syndicate planned to commence development of this showing in a short time, but shortly after the work was stopped on account of snow. Operations will be resumed in the spring of 1921.

FORT GEORGE SECTION.

At the present time there is practically no actual mining going on in this section, but there is some prospecting and small amounts of development on some properties are carried on each year. Some claims in the neighbourhood of Prince George were described in the 1914 and 1918 Annual Reports, but no further work had been done on them.

A silver-lead property owned by Oscar Eden, of Prince George, and partners, and situated some 50 miles to the north-east of Prince George, has been partially developed. This property was not examined by the writer, but was examined by L. Reinecke, of the Geological Survey of Canada, his report being issued in Memoir No. 118 of the Geological Survey. Mr. Reinecke's report is as follows:—

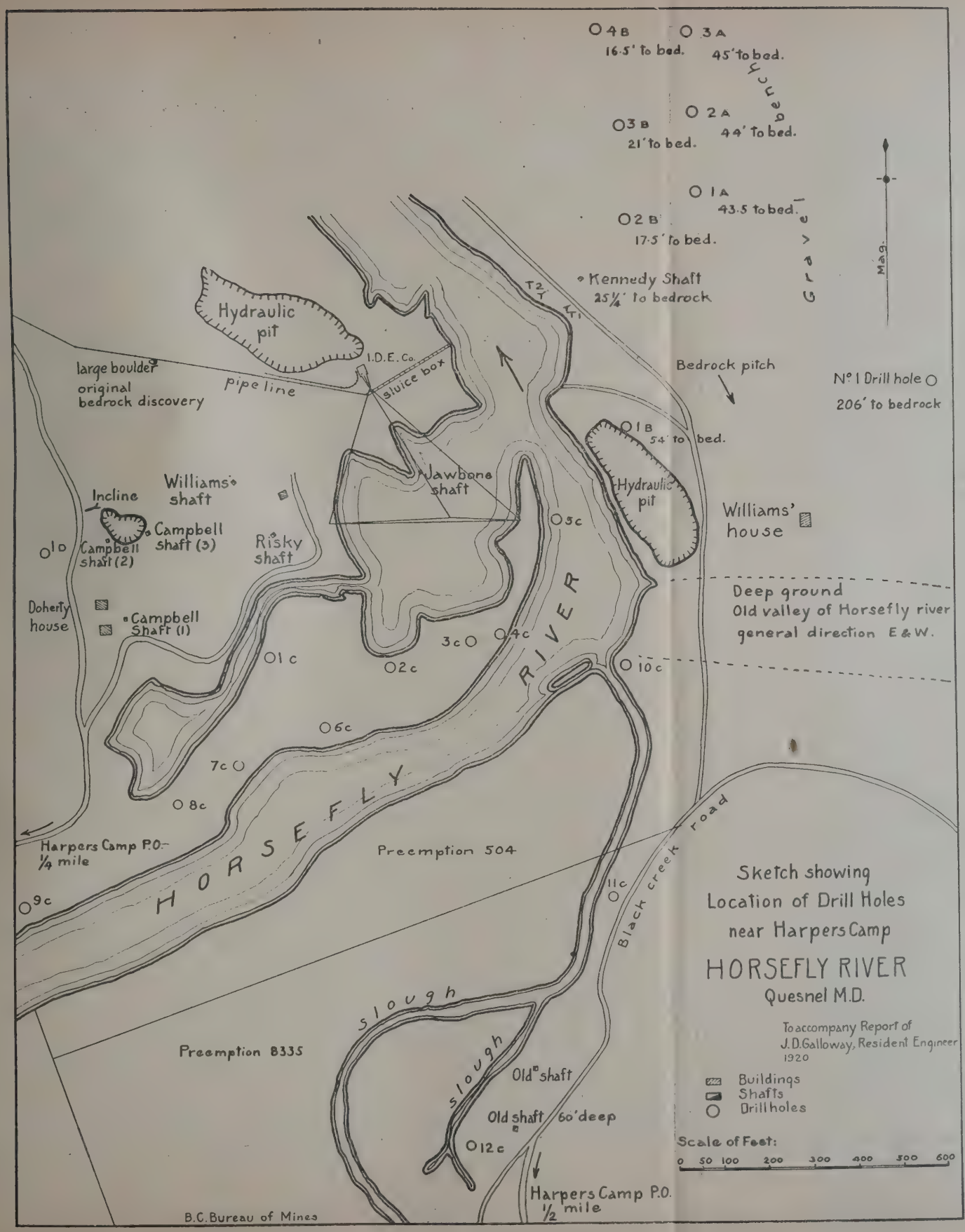
"A prospect owned by Oscar Eden, of Prince George, and others, situated just north of the most northerly bend of Fraser river, carries values in silver, lead, and gold. The property is connected by steamer-channel up the Fraser with Hudson Spur, near Hansard, about 24 miles east, on the Grand Trunk Pacific Railway, and to Prince George, about 50 miles down the river to the south-west. The route to Hudson Spur is in quiet water all the way, but there are several long rapids down the river toward Prince George. Developments on this property include a tunnel and shallow shaft. The tunnel, within 100 feet of the north bank of the river, is about 95 feet long, trending about north 40° west. The country-rock is a quartz muscovite chlorite schist carrying some carbonate. A sheared zone about 3 feet wide and dipping east carries quartz with pyrite. In places in the tunnel it lies between fairly solid walls, the easterly wall being apparently more schistose, but otherwise of the same character as the wall on the west side. There has been much faulting and silicification of the country-rock. The shaft lies 300 feet in elevation over the river, about 1,800 feet north of it, and about 750 feet east by south of the north-east corner of Eden's homestead lot. Galena occurs in quartz that is from 5 to 6 feet in width lying between well-defined walls of schist. The walls strike 285° magnetic north (46° true north) and dip 60° to 65° to the north-east. Faulting on the foot-wall is represented by 8 inches of black and red gouge. About 20 feet of the length of the ore-body has been exposed. If the strike of the ore-zone be followed in an easterly direction for 550 feet along the side-hill a gulch is crossed running S. 67° W. toward the Fraser. Two hundred feet down the gulch from where the strike of the ore-zone would cross the gulch are boulders of quartz, some of them 2 feet across, with much galena. They must have moved downhill from their outcrop and are a very excellent indication that the ore-zone has a length of from 500 to 600 feet at least.

"Samples taken from various places in the tunnel and in the foot-wall of the ore-zone at the shaft are said to have carried radium. The writer took samples from the gouge in the shaft and from points in the tunnel, as near as possible to the points from which the original samples are said to have come from, but a test on these samples by H. V. Ellsworth, of the Geological Survey, did not indicate any trace of radium. According to Mr. Eden, samples taken by him across the outcrop near the top of the shaft gave 13 oz. of silver and 15 per cent. of lead to the ton, whereas a sample across the ore at the bottom of the shaft yielded 25.8 oz. of silver, 42 per cent. of lead, and a trace of gold. The writer did not sample this ore-body, but galena is plentiful through the quartz.

"Assays made from samples 30 and 60 feet from the mouth of the tunnel are said to have yielded respectively 3 oz. silver, 50 cents in gold, with some lead, and $4.80 in gold.

Placer-prospect Drilling, Horsefly River.

Taltapin Mining Co.'s Camp, Omineca M.D.


4B
16.5' to bed.
3A
45' to bed.
2A
44' to bed.
3B
21' to bed.
1A
43.5 to bed.
2B
17.5' to bed.
Kennedy Shaft
25¼' to bedrock
Mag.
Hydraulic pit
large boulder original bedrock discovery
pipe line
I.D.E. Co. sluice box
Bedrock pitch
No 1 Drill hole
206' to bedrock
1B
54' to bed.
Jawbone shaft
Hydraulic pit
Williams' house
Williams shaft
Incline
Campbell shaft (3)
Campbell shaft (2)
Risky shaft
1D
5c
Doherty house
Campbell Shaft (1)
Deep ground
Old valley of Horsefly river
general direction E & W.
3c
4c
1c
2c
10c
RIVER
6c
7c
8c
HORSEFLY
Harpers Camp P.O.
¼ mile
Preemption 504
9c
11c
Black creek road
slough
Preemption 8335
slough
Old shaft
Old shaft 60' deep
12c
Harpers Camp P.O.
½ mile
B.C. Bureau of Mines
Sketch showing
Location of Drill Holes
near Harpers Camp
HORSEFLY RIVER
Quesnel M.D.
To accompany Report of
J.D. Galloway, Resident Engineer
1920
Buildings
Shafts
Drillholes
Scale of Feet:
0 50 100 200 300 400 500 600

"A company known as the North Point Mining Company, of which Oscar Eden is president, has been formed to develop this property. Surface-trenching should be done to prove the outcrop over as long a distance as possible, so as to determine its dip and strike and whether it has been faulted. With this information it should be possible to drive a crosscut to meet the lead from a point on the steep side-hill south of and below its outcrop. This would give adequate drainage. There are plenty of good landing-places for scows along the north bank of the river. The company owns a large motor-boat and the ore can be conveniently transported to the railway at Hudson Spur. This is the most promising looking of the prospects dealt with in this chapter."

Ahbau Lake Section.

In August a trip was made into Ahbau lake to examine some quartz-showings in that section. From Cottonwood Post-office, which is on the Barkerville road 20 miles from Quesnel, a pack-trail runs to the southern end of Ahbau lake, a distance of 16 miles. From the end of the lake a rough trail continues up the western side of the lake and on to the headquarters camp of Guthrie & Gray, which is situated on Ahbau creek, a short small stream flowing from Hay lake to Ahbau lake. The headquarters camp is distant about 25 miles from Cottonwood and Ahbau lake is about 6 miles long.

Guthrie & Gray also have a cabin camp on the shore of Ahbau lake near the northern end. Their quartz claims are situated on the eastern side of, and about half a mile away from, the Willow river, and are distant about 5 miles from their Lake camp.

Ahbau creek was worked some years ago by Chinamen for placer gold, but none of the workings were on a very extended scale. During recent years Guthrie & Gray have worked portions of the creek-bed and have taken out some gold. The creek ground is shallow, from 2 to 10 feet in depth, and there is not sufficient grade for hydraulic operations. So far as tested the bench-gravels do not carry appreciable gold. These placer operations have been on a small scale.

Moosehorn Group.

This group of mineral claims, owned by Guthrie & Gray, consists of the *Willow*, *Buster*, and one other claim. The showings on the claims are at an elevation of about 3,000 feet and are situated on Moosehorn creek about half a mile from the Willow river. There are several quartz-croppings on the hillside and in the bed of the creek which represent two or more veins. The main vein is exposed along the hillside for a distance of about 150 feet and has a general east-and-west strike (mag.). It has a width of from 4 to 6 feet of quartz and is developed by a tunnel 15 feet long and some surface cuts. The vein exposed in the bed of the creek is similar in character and has a width of from 2 to 4 feet.

Both veins are sparingly mineralized with galena, zinc-blende, pyrite, and arsenopyrite. The surface is somewhat oxidized, giving a rusty appearance to the quartz. The percentage of metallic sulphides in the quartz gangue is as a rule low. The country-rock in which the veins occur is a dark schistose rock which on examination is seen to be mainly dark-blue quartzite and argillite. The formation is cut in places by narrow feldspathic dykes. The quartz gangue has in places a certain amount of sericite mica developed in it. Selected samples of the ore are said by the owners to have returned good values in gold and silver as well as a lead content.

The following samples were taken from the property for assay:—

Description.	Gold.	Silver.	Lead.	Zinc.
		Oz.	Per Cent.	Per Cent.
Average from dump from cut on lower vein.....	Trace	1.8	4.5	2.0
Selected ore from same dump	„	15.8	32.5	2.0
Across 4½ feet quartz from face of upper vein tunnel	„	1.6	1.0	..

The property is not as yet developed to any extent, and if these veins were opened up more, or in other places, a higher mineral content might be found in them. Surface-cutting of the veins along their line of strike might be useful.

Silver Knife. This claim, which is owned by William Harper, is situated 5 miles to the north-east of the south end of Ahbau lake. Irregular and broken lenses of quartz occur here in a schist formation. A tunnel has been driven in 90 feet and some crosscuts run from it. The quartz shows but little mineralization and assays of representative samples show only traces of gold and silver.

BARKERVILLE SECTION.

Hopp Placer Mines. Of the placer properties controlled and operated by John Hopp in the vicinity of Barkerville, only two were operated this year, these being *Lowhee* and *Stouts Gulch*. Operations were in no way different from former years and about the same yardage and grade of ground was handled as last year, so that the returns were about the same. The early part of the season was unsatisfactory on account of adverse water conditions. An unusually late spring made it late in the season before hydraulicking could be started, and then the available water went off with a rush and in a short time operations had to be curtailed on account of a shortage of water. This was compensated, however, by better water conditions in the last half of the season, as an unusually heavy rainfall extending from late summer right through the fall supplied an abundance of water.

Waverly. This hydraulic mine, situated on Grouse creek, was operated throughout the season under the management of E. Moore. A large amount of dead-work was done this year in opening up a pit to gain access to the pay-channel, but it is believed that this will be reached now in a short time. This is an old property taken up two years ago by Moore and associates, and it was realized that the opening-up of the property in a new place would take considerable preliminary work.

Other Placer Properties.—The *Point* mine on Slough creek was operated as usual throughout the season under the management of Joseph Wendle. A satisfactory clean-up is reported.

The Lightning Creek Hydraulic Mining Company's property, situated 2 miles up Lightning creek from the town of Stanley, was operated during the season under the management of Lester Bonner. It is not known what success was attained.

On the property of the Lightning Creek Gold Gravels and Drainage Company on Lightning creek, at Wingdam, work was continued during the winter on the new shaft started in the fall of 1919. Owing to the heavy pressure of water the shaft was lost and the attempt to reach bed-rock at this point had to be abandoned. A manager and some workmen have been on the property all year, but no further plan of development has as yet been inaugurated.

A successful season is reported by Sparks & Felker, who operate a small-scale hydraulic plant on Perkins gulch D. D. Fraser joined the partnership this season and the plant was extended to give a better water-supply.

Small-scale work by individuals on several creeks and on bars of the Fraser river were carried on as usual during the season.

Proserpine Mountain.

The bonding of two groups of quartz claims on Proserpine mountain last fall by a Toronto syndicate led to the hope that productive quartz-mining would soon be inaugurated in this section, but unfortunately these hopes have not yet materialized. The properties bonded were those owned by E. E. Armstrong and Tregillus and partners. R. A. Bryce, of Toronto, was in charge of the work, and from October, 1919, until February of this year from forty to sixty men were kept at work. A considerable amount of surface crosscutting and stripping of the veins was done and a number of shallow tunnels were run. Hundreds of samples of the quartz and associated schist were taken, and apparently the syndicate considered that a pretty thorough examination of the properties had been made. The decision arrived at was that the properties did not give promise of yielding a large tonnage of low-grade gold ore which could be mined and milled at a profit. As a payment on the bonds was coming due in March, the option was therefore allowed to lapse. The owners were negotiating with other parties during the year to take up the properties, and are quite confident that they will be able to arrange another deal.

Some further work was done during the summer by individuals on quartz veins on the mountain.

QUESNEL MINING DIVISION.

Quesnel Section.

Cottonwood River.

Some promising dredging-ground has been located on the Cottonwood river and a number of leases changed hands this year. It is expected that testing of the ground will be commenced next year, with the possibility of one dredge being installed in the near future.

Quesnel River.

The Cariboo Gold-Platinum Extracting Company commenced operations this spring on its leases on the Quesnel river, some 15 miles up the river from the town of Quesnel. The necessary machinery for a drag-line scraper type of dredge was taken in and erected on the ground. The equipment at the plant consists of a 1-yard Sauerman cableway excavator, double-drum donkey engine, 32-horse-power boiler, 8 by 10 centrifugal steam-pump, amalgamator and concentrator (Marsh patents), cables, etc. The necessary buildings, towers, etc., have been erected.

A test run of about two weeks was made late in the fall before closing down for the winter season, and it is said that satisfactory results were obtained.

The primary object of this company is to engage in the business of extracting gold and platinum values from the black sand occurring in the placer-gravels. S. J. Marsh, promoter of the company, has experimented with this matter for some years past and now has a patented process for extracting these metals. Furthermore, as a result of his investigations, Mr. Marsh claims that at many places on the Quesnel and Fraser rivers and their tributaries the gravels do contain black sand containing appreciable platinum values. These values, together with a certain amount of flour gold, are not recovered in the ordinary process of hydraulic mining or dredging, and Mr. Marsh therefore believes that his process will open up a new field of activity in mining in the district.

The company plans to erect next year a plant on 2-Mile flat at Quesnel, which will treat the black-sand concentrates from any placer-mining enterprise in the district. In order to have something to start on and also to demonstrate the possibilities, the company has erected the drag-line scraper plant previously referred to, and will mine the gravels for the black-sand content as well as any coarse gold that may be recovered.

It is known that the black sand of the Quesnel river and some of its tributaries do contain varying and irregular amounts of black sand, especially where a natural concentration of the gravels has taken place. It is therefore encouraging to have an attempt made to mine some of these gravels for the platinum content.

After organizing the company Mr. Marsh succeeded in interesting Minneapolis capital in his project. Herbert E. Crosby, of Minneapolis, who is vice-president of the company, visited the property this fall while the test run of the scraper plant was being made, and expressed himself as being well satisfied with the progress so far made. It is planned to continue operations on a larger scale next season.

Hydraulic.

The big hydraulic plant of the Quesnel Hydraulic Gold Mining Company at Hydraulic, on 20-Mile creek, was operated throughout the season. As in the last three years, the work was mainly the testing on a large scale of certain parts of the gravel-deposits with the hope of finding a pay-channel. It is reported that the season's operations were more successful than in former years and that a fair clean-up of gold was made.

Keithley Section.

The *Kitchener* placer mine on Keithley creek, owned by Harrison & Worth, was acquired this year by a syndicate formed by some of the directors of the Quesnel Hydraulic Gold Mining Company. K. C. Laylander, manager of this company, was also in charge of the work at the *Kitchener* mine.

Harrison & Worth had worked this property since 1914 as a drift-digging and were mining in an old high channel of Keithley creek. In 1919 they were particularly successful, as, having reached a rich part of the old channel, they took out good pay and made a good clean-up for the season.

On acquiring the property the new owners decided to work it as an hydraulic mine, as the conditions are nearly ideal for this method of working. The overburden is not excessive, there

is ample fall for a dump, and Keithley creek can be utilized to supply an abundance of water for hydraulicking for a long season.

During the summer the necessary equipment for an hydraulic plant was taken in, including a portable sawmill to saw lumber for the flume. The pipe-line, flume, and all necessary plant was erected and a short run was made before closing down for the winter. It is expected that this property will be an important producer next year.

HORSEFLY SECTION.

Keystone-drilling at Harpers Camp.

Introductory.—The prospecting by Keystone-drilling of certain placer-gravels in the vicinity of Harpers Camp was commenced in December, 1919, by the British Columbia Department of Mines. The drilling was continued until April of this year, when it was stopped pending the arrival of new casing and other equipment. Drilling was recommenced early in August and was continued until December, when the work was again stopped.

Harpers Camp is situated on the Horsefly river, 35 miles in an easterly direction from 150-Mile House on the Cariboo road. A weekly stage from 150-Mile House gives access to the place.

The history of placer-mining in this section is much the same as in other parts of the Cariboo District—namely, vigorous mining in the early sixties by hand-work in the easily available rich ground, followed later by the working of the ground on a larger scale with the aid of modern machinery.

The important productive ground near Harpers Camp was a small area lying in and along a bend of the Horsefly river, the original location being known as Harpers bar. The estimates of the amount of gold taken from this area vary considerably, ranging up to $500,000 or more. This ground was first drifted by the old-timers, and was eventually worked by R. T. Ward by hydraulic methods and using an hydraulic elevator to raise the gravel from pits to the sluice-boxes. It is quite certain that the early work paid handsomely, but it is difficult to ascertain whether or not any profit resulted from the operations of R. T. Ward. Some portions of the ground paid and others did not, but the average result of the whole is unknown. It must be remembered, though, that the Ward ground had had the best of the gold taken out by the old-timers.

The character of the gold taken from this ground (known as Ward's Horsefly) was uniformly fine, flat, and well worn; grains the size of flax-seed formed the greater portion of the gold taken out. It is quite evident that the gold in this area of ground had travelled a considerable distance and is not of local origin. Presumably it had its origin at some unknown point away up the Horsefly river.

The Horsefly river, both above and below Ward's Horsefly, has been fairly thoroughly prospected and a little gold has been taken out in places; no place comparable in richness with the Ward ground has, however, been found. The conclusion has therefore been reached by many that the gold in Ward's Horsefly did not get there by following the present river-channel. An old channel of the river is postulated in order to account for this remarkably rich spot with barren ground above and below.

It has been supposed that the present Horsefly river at this point cuts across an old (pre-glacial) channel rich in gold-bearing gravel, and that the pay-ground was thereby exposed. Assuming this theory to be correct, the conclusion was reached by many that the old channel, if explored further, would yield similar rich gold-bearing gravel.

Considerable work has been done at different times in the past in an endeavour to explore this supposed old channel at points not far distant from the Ward ground.

A considerable amount of money was spent in what is known as the "Miocene" shaft. This enterprise was carried out by the Miocene Gravel Mining Company with the expectation of finding a continuation of the rich channel worked at Ward's Horsefly.

The main shaft was sunk at a point about one-third of a mile south of Ward's Horsefly pit; it was put down 500 feet before striking bed-rock. The whole work was well done, the shaft being 3-compartment and well timbered and the machinery complete for the purpose. In sinking this shaft the gravel was found to be capped with about 100 feet of boulder-clay, after which about 400 feet of gravel was passed through containing in places small amounts of gold, but not in paying quantities. This gravel is free and very uniform in size, being composed almost

entirely of smooth, worn, white quartz pebbles. In this it differs materially from the wash as seen at Ward's Horsefly, which is bluish in general colour and contains many different rocks besides quartz pebbles.

During the spring of 1900 the pumps, pumping-station, and machinery generally were overhauled and the shaft sunk 50 feet deeper in bed-rock. From this level a drift was run for 500 feet in the direction of and under the channel. From this rock drift upraises were made into the gravel-channel. When the last upraise was put up, which struck gravel in 15 feet, the rush of water and gravel flooded the workings. Since this occurred no further work has ever been done in the shaft.

Reports vary as to the gold-tenure of the gravel taken from the upraises into the channel, but it would seem only low values were obtained, not sufficient to pay by drifting operations. It is to be regretted that when so much capital was expended in this enterprise the testing of the channel was not carried further.

A number of shallow shafts were put down by hand-work in the vicinity of Ward's pit, but owing to the amount of water to be handled none of these were sunk to any great depth and practically none of them reached bed-rock.

Some Keystone-drilling was done in the area by an Eastern syndicate some years ago.

Physical Features.—Attached to this report is a map showing that portion of the Horsefly which includes Ward's Horsefly pit and adjacent territory and the location of drill-holes put down by the Government. The country is rolling and the actual channel of the Horsefly is cut down from 20 to 30 feet below the general level. The grade of the river is slight, not being sufficient to carry off hydraulic tailings. In all the work done here it has been necessary to elevate the gravel in order to make an artificial dump.

The original discovery at "Harpers bar" (Ward's Horsefly) was at a point in the river-channel where bed-rock was naturally exposed. From this high point the bed-rock apparently pitches off in all directions. To the north-east, east, and south the ground has been worked with the bed-rock pitching gradually, and consequently the workings getting deeper. The limiting depth with Ward's hydraulic elevator was reached at between 50 and 60 feet.

Before mining operations commenced in this area the Horsefly river flowed to the west of the present course. Wing-damming of the stream and the piling-up of hydraulic tailings deflected the course of the river locally.

There is a considerable depression or old valley crossing the Horsefly river, running in a general east-and-west direction at this point. Beaver valley may be a continuation of this old valley in the westerly direction, while to the east the old valley connects with the present Horsefly river.

A topographic map of the Harpers Camp area was made in the season of 1919 by a party of the Geological Survey of Canada under the direction of Dr. B. R. MacKay. This map has not been issued yet.

Drilling.—The main object in the Government drilling at Harpers camp was to find if possible some extension of the rich area and to obtain information as to whether or not there was a rich gold-bearing channel feeding this area.

The drilling operations may be divided into two parts, that done from December, 1919, to April, 1920, and that done from August to December, 1920.

To begin with, a hole was started a short distance from Williams House on what was believed might be the rim of the old channel of the Horsefly. This was sunk about 100 feet, at which point it had to be stopped until more casing and cable was secured.

A number of shallow holes were then put down on the ground controlled by the International Dredging Company. This company's plant consists of a drag-line scraper system capable of digging and elevating gravel to a height of about 30 to 40 feet. This plant was erected with the idea of reworking the ground in the vicinity of Ward's pit, and where it was hoped some extension of the rich area, previously unworked, would be found. The plant was operated during parts of the summers of 1918 and 1919, but very little gold was recovered. Apparently the ground handled consisted mainly of old hydraulic tailings.

As will be seen from the accompanying plan, twelve holes were drilled at different points ahead of the International plant. These holes ranged up to 50 feet in depth, but in no case reached bed-rock. The drilling results were mainly negative, but proved that there was no important area of ground in this vicinity carrying sufficient gold to pay to work with the plant

of the International Dredging Company. The company has therefore ceased operations entirely. When the drilling was recommenced in August with an adequate equipment of casing, etc., the No. 1 hole (near Williams House) was continued and sunk down to bed-rock, a total depth of 216 feet. This depth was greater than had been expected and showed there was a deep channel at this point. It was obvious that to continue a cross-section of holes south-easterly from this point across the old channel of the Horsefly would involve very deep drilling, as the indications showed that the ground would be progressively deeper to the south-east.

The drilling was therefore continued to the north-west, where shallower ground was believed to exist. Seven holes were put down ranging from 17½ to 55 feet, all being sunk to a bed-rock and some holes a short distance into bed-rock. Some values were disclosed by this drilling, but not sufficient to make pay-ground. This completed the drilling on the eastern side of the river, as it was believed that sufficient information had been obtained.

The last hole put down was on the western side of the river near an old drill-hole put down some years ago. In this vicinity R. H. Campbell and partners had sunk three shafts during the summer by hand-work, without getting definite results. It had been reported that good values had been disclosed by the old drill-hole, and so at the request of Campbell a hole was put down to check this and thereby assist the work of exploring this area.

The following table shows the holes drilled, total depths, and depths to bed-rock.

Hole No.	Depth.	Depth to Bed-rock.	Remarks.
	Feet.	Feet.	
1	211	206	Norma lease.
1c	25	Unknown	Lease 1360.
2c	28	,,	,,
3c	28	,,	,,
4c	38	,,	,,
5c	36	,,	,,
6c	42	,,	,,
7c	46	,,	,,
8c	41	,,	,,
9c	37	,,	,,
10c	52	,,	,,
11c	39	,,	,,
12c	37	,,	,,
1A	49	43½	Kahm group.
2A	44½	44	,,
3A	53	45	,,
1B	55	54	,,
2B	21¾	17½	,,
3B	22	21	,,
4B	17½	16½	,,
1D	51	50	Campbell group.

Values.—No. 1 hole showed no value whatever throughout the length of the hole. Of the holes, Nos. 1c to 12c only one showed important values; that one being No. 4c. The following table shows the distribution of the values in this hole:—

Footage.	Mg. of Gold.	Value per Cubic Yard.
0 to 10	.....	*Nil.*
10 to 21	.....	*Nil.*
21 to 24	60.0	$1.20
24 to 26	.....	*Nil.*
26 to 28	Some fine colours.	Practically *nil.*
28 to 30	590.0	$17.70
30 to 32	613.5	18.40
32 to 33	270.0	16.20
33 to 34	110.0	6.60
34 to 38	40.0	0.60

Average value for the total depth of 38 feet of hole, $2.66 a yard.

It will be seen that the main values are contained in a strata lying from 28 to 33 feet in depth, about 87 per cent. of the total gold occurring in this 5 feet. This section of the hole has a value of $17.68 a yard.

From the log of the hole as turned in by the foreman, the first 12 feet of the hole was in surface river-wash gravel; then came 9 feet of slum; from 21 to 32 feet the drill passed through a fine blue gravel with some streaks of clay; from 32 to 38 feet the material was a coarse blue gravel with some streaks of heavy sticky clay. This blue gravel from 21 to 38 feet was cemented sufficiently to render it unworkable by a scraper or dredge. Apparently the only feasible way to work this ground would be by drifting operations, and in that case the water might prove difficult to handle.

The series of holes 1A to 4B showed certain values in places, but in none of them are the values sufficient to make it profitable to work the ground. The following table shows the results:—

Hole. No.	Value per Cubic Yard.
1A	Practically *nil.*
2A	12 cents.
3A	Practically *nil.*
1B	„ „
2B	14 cents.
3B	1 cent.
4B	4 cents.

Hole No. 1D showed little or no values.

Tests were made on a number of samples from the drill-cores to determine if the concentrates carried any combined gold. The samples were panned down and the colours of free gold removed from the concentrates. These concentrates, consisting of black and ruby sand, were separated into magnetic and non-magnetic samples, and these samples assayed for gold and platinum.

The assay results showed that where the concentrates had had the free gold entirely removed there was practically no contained gold content in them. A low platinum content was obtained in one sample, but too slight to have any commercial importance.

Conclusions regarding Origin of Deposit.—There is now available a certain amount of information regarding the deposit of rich auriferous gravel situated at Ward's Horsefly. This information may be divided into: (*a*) Facts deducible from surface topographic features; (*b*) information from old workings, shafts, etc.; (*c*) information from Government drilling.

From the available information different theories as to the origin of the rich deposit might be derived. The following ideas are advanced by the writer, but are subject to modification in the light of fuller information:—

From a consideration of the present topographic features, together with information of the depth of ground from shafts and drilling, it is quite apparent that an old channel of the Horsefly is crossed at this point by the present Horsefly river. This channel flowed in from the east, occupying the flat which stretches easterly from Williams House. Apparently the Miocene shaft explored a continuation of this channel to the west. The available evidence indicates that but little gold was found in the gravels of this old channel as explored by the Miocene shaft. The evidence from other old shafts and Keystone-drilling tends to confirm the conclusion that the gravels of this old channel contain but small amounts of gold.

The rich ground in Ward's pit contained the gold partly in a yellow gravel and partly in a lower strata of blue gravel, the latter perhaps being the most important gold-bearing strata. The blue gravel at this point is nearly identical with the gold-bearing gravel at Hobson's Horsefly, 5 miles down-stream from Ward's pit. At Hobson's Horsefly the gravels worked were part of an old channel of the river lying a short distance from and parallel to the present channel of the Horsefly river.

It is apparent that the gold-bearing gravels at Ward's pit are quite different from the white quartz gravel of the old east-and-west channel of the Horsefly which was partially explored by the Miocene shaft. The blue gold-bearing gravel, which as a rule has been fairly well cemented, has been previously classified as pre-glacial in age,* but complete evidence of this

* B. R. MacKay: Summary Report, G.S.C., 1918, Part B.

is lacking. It at least is older than the present stream-gravels, but is apparently younger than the gravels of the east-and-west ancient channel.

The occurrence of gold in the yellow gravel, which is a modern stream-gravel, would appear to have originated by erosion and concentration of the blue gravel. The problem is therefore reduced to the origin of the blue gravel and its gold content. It would seem to be fairly well established that this blue gravel has been deposited by the Horsefly river while occupying more or less its present channel. This blue gravel as originally coming down the river probably carried a small gold content, and at certain favourable points, depending on local conditions, this gold would be concentrated to a greater or less degree. Where the Horsefly river crossed the old east-and-west channel local conditions were such as to cause a considerable concentration of gold in the blue gravel deposited at that point. Here the river crossed a wide, deep, gravel-filled channel with a high rim of bed-rock on the northerly side, over which rim the river necessarily had to carry its burden of sand, clay, and gravel. This high rim-rock acted as a natural riffle to prevent the free flow of gold down the river, with the result that a concentration of gold was made at this point, a sufficient concentration to make the rich diggings at Harpers bar.

After the deposition and partial cementation of the blue gravel, which may have occurred during an interglacial period, the course of the Horsefly was slightly but not materially altered, as is shown at Hobson's Horsefly. At Harpers bar the river continued to occupy approximately the same channel. Partial reworking of the blue gravel resulted in the formation of the gold-bearing yellow gravel, with the rich ground again concentrated at and near the high bed-rock or old rim-rock exposed in the river-channel. It is significant that phenomenally rich ground was found around a large boulder lying on bed-rock near the point where the bed-rock was originally exposed in the channel.

The bed-rock, as previously stated, dips away in all directions from the high point originally exposed, and as the workings went deeper the gold values as a rule decreased.

The evidence from drilling and shafts is that the blue gravel carries slight amounts of gold wherever it is explored, but that only in the original workings of Ward's pit does it carry pay values. The drilling done along the A and B lines prospected the rim of the ancient east-and-west channel, and the logs of the holes show that after going through modern river gravel or clay the drill penetrated blue gravel down to bed-rock. While these holes were on the rim of the old channel, they were also along the rim of the present channel, which may account for the blue gravel having but little or no gold in at that point. The gold-bearing blue gravel was carried along in the centre of the stream with but little gold distributed to the rims.

Hole No. 4c yields interesting results, in that it shows that the pay-streak of Ward's pit extends at least that far to the south. It must be remembered, though, that this hole is only about 150 feet south of old workings. At the time that the series of C holes were put down the drilling equipment only permitted the sinking of shallow holes. It is unfortunate that some of these holes were not put down to bed-rock, as they might have yielded useful information.

The nearest holes to hole No. 4c are Nos. 3c, 5c, and 10c. The logs of these holes show that blue gravel was penetrated in each case, but that no appreciable gold was found. The holes were shallow, however, and the blue gravel at greater depths might contain some gold.

Conclusions.—The following tentative conclusions have been arrived at regarding this deposit of auriferous gravel, which, however, may have to be modified when fuller information is obtained:—

(1.) The physical character of the gold found at Ward's Horsefly is such that it must have been transported a considerable distance; it therefore probably had its origin near the head-waters of the Horsefly river.

(2.) The gravels coming down the Horsefly river, either in the present or older channels, carried small amounts of gold, but only in workable quantities where a very considerable natural concentration of the gravels took place. It follows therefore, that a long continuous channel of rich gold-bearing gravel feeding the Ward's Horsefly area will not be found.

(3.) The high gold content of the auriferous gravels at Ward's Horsefly was due to the local physical conditions at that point causing an extreme concentration of the gold in a small area.

(4.) Some extensions of the present known and worked-out area of rich gravels may yet be found. This extension is most likely to exist in a direction up-stream from the old workings. The ground will probably be deep and may prove difficult to mine owing to water.

Mica Syndicate, Tete Jaune—Mica Claim.

Mica Syndicate, Tete Jaune—Camp.

(5.) The drilling so far carried out by the Government has been of a prospecting nature. If a policy of further drilling is decided upon, the ground in a southerly direction from the old workings should be further prospected. An extension of the pay-ground shown in hole No. 4c might be located by further drilling.

(6.) The pay-ground shown in hole No. 4c warrants further investigation. This ground could probably be mined by a shaft-sinking if some arrangement was made to handle the water.

CARIBOO DISTRICT.

CARIBOO MINING DIVISION.

REPORT BY L. A. DODD, GOLD COMMISSIONER.

I have the honour to submit herewith the office statistics for the year ended December 31st, 1920.

The revenue shows a substantial increase over the last calendar year.

OFFICE STATISTICS—CARIBOO MINING DIVISION.

Free miners' certificates issued (Barkerville, 190; South Fort George, 181; Quesnel, 132)	503
Mineral claims recorded	52
Certificates of work ("Mineral Act")	143
Conveyances and agreements recorded	86
Powers of attorney recorded	49
Placer claims recorded and rerecorded	17
Leaves of absence (placer)	14
Applications for placer-mining leases	70
Placer-mining leases issued	67
Certificates of work ("Placer Act")	5
Placer-mining leases in force	335

Revenue.

Free miners' certificates (Barkerville, $1,691.25; South Fort George, $807.50; Quesnel, $513.75)	$ 3,012 50
Mining receipts, general	22,233 28
Other sources	1,039 50
Total	$26,285 28

OMINECA MINING DIVISION.

REPORT OF STEPHEN H. HOSKINS, GOLD COMMISSIONER.

I have the honour to forward herewith the office statistics for the Omineca Mining Division for the year ending December 31st, 1920.

The District Resident Mining Engineer will undoubtedly, as in the past, furnish your Department with a full report on mining conditions in this Division.

Although there has been considerable activity in prospecting on placer-mining leases along the Finlay river and certain portions of the Peace river, no definite information regarding results have so far been received at this office.

When the amendments to the "Placer-mining Act" of 1920 become fully understood and are working smoothly, we should come in closer touch with any development that may be taking place.

It will be undoubtedly noted with satisfaction that the revenue received in 1920 exceeds the amount taken for the same period of 1919 by over $7,000.

OFFICE STATISTICS—OMINECA MINING DIVISION.

Free miners' certificates (ordinary)	577
Free miners' certificates (company)	10
Free miners' certificates (special)	1
Mineral claims recorded and issued	222

Certificates of work issued	588
Placer claims recorded and issued	6
Bills of sale and mining agreements, etc.	259
Powers of attorney recorded	53
Mining documents filed	82
Certificates of improvements recorded and issued	31
Crown grants of mineral claims issued	31
Applications for placer-mining leases (Omineca Division)	24
Applications for placer-mining leases (Peace River Division)	42
Placer-mining Leases issued (Omineca Division)	13
Placer-mining Leases issued (Peace River)	31

Revenue.

Free miners' certificates	$ 3,466 00
Mining receipts	15,912 20
Total	$19,378 20

QUESNEL MINING DIVISION.

Report by R. M. McGusty, Mining Recorder.

I have the honour to submit herewith my report on mining operations in the Quesnel Mining Division of the Cariboo District for the year ending December 31st, 1920.

As in the past, the Resident Mining Engineer will furnish you with reports on actual mining development during the past season and the result of the operations of the Keystone-drilling near Harpers camp.

During the season under review there has been little change in conditions in this division; the *Kitchener* mine on Keithley creek and the Quesnel Hydraulic Gold Mining Company at 20-Mile being the only two mining concerns employing crews.

In regard to the *Bullion* property there is no change to report.

The result of the work in connection with the Keystone drill operating in the Harpers Camp section under the Department of Mines will be watched with interest, such work being of undoubted assistance to the miners in that locality, and if the report is favourable a fresh impetus to mining in that section will result.

During the past season the demand for mining leases has been active, due in no small measure to the reduction in lease fees and amendments to the lease laws.

Office Statistics—Quesnel Mining Division.

Free miners' certificates issued	149
Mineral claims recorded	24
Certificates of work recorded	10
Placer-mining records	12
Placer mining rerecords	9
Powers of attorney recorded	20
Bills of sale and mining documents	5

EASTERN DISTRICT (No 5).

REPORT BY A. G. LANGLEY, RESIDENT ENGINEER.

(Reports marked * are by B. T. O'Grady, Assistant.)

INTRODUCTORY REMARKS.

The mineral industry of the district has suffered during the year from the scarcity of labour, which in some cases has been accentuated by strikes called by the O.B.U. Early in May a strike called by this union in the Slocan Mining Division greatly curtailed the operations of the leading mining companies, with the one exception of the Silversmith Mines, Limited, which company saw fit to accept the terms of this union. Labour is now more plentiful and the Slocan is getting back into its stride once more. It is reported that from about November 15th the various mines have had full crews working and that the strike has been definitely broken.

The outstanding feature governing this year's production of lead and zinc has been the continuous operation of the great *Sullivan* mine by the Consolidated Mining and Smelting Company. Under adverse conditions this mine has greatly exceeded last year's output, and has been able to supply the smelter with a steady stream of ore, thus offsetting the decrease in tonnage from other sources.

In view of the high cost of labour and supplies, conditions cannot be considered ideal for the mining of gold ores; it is therefore encouraging to note that there have been new and important developments in this direction during the year, which leads to the conclusion that as soon as conditions become more normal, and the ounce of gold represents a greater purchasing power than at present, event greater activity will be witnessed among the gold properties.

Mining operations on a small scale have not been seriously affected by the labour situation, and it is safe to say that the past season has been an exceptionally busy one in the hills for the small operator, leaser, and prospector. To my knowledge, many results obtained among the prospects have been very encouraging, and it is fully anticipated that next season will see a number of new names on the shipping-list, providing market conditions are favourable.

The production of coal from the Crowsnest fields shows a substantial increase over that of last year, the total output being over 800,000 tons.

In this district during the season three soldier prospecting parties were assisted by the Government. Two of these chose the Big Bend district north of Revelstoke, and a third the Golden Mining Division.

B. T. O'Grady was appointed assistant to the Resident Engineer on June 1st. His time was mostly employed in the Slocan, Nelson, and Ainsworth Divisions, and many applications for assistance on road and trail construction received attention which otherwise would necessarily have been neglected through lack of time.

The season was a busy one both in the East and West Kootenay; numerous applications were received for examinations and assistance on road and trail construction, and altogether about eighty-five properties were visited.

EAST KOOTENAY DISTRICT.

GOLDEN MINING DIVISION.

The shortness of the open season greatly curtailed the field-work in this Division, and time did not allow as many examinations as was anticipated. Prospecting has shown signs of revival, though not commensurate with the scope that this large and well-mineralized area affords.

The principal producer is the *Monarch-Couverapee* property at Field, which, under the management of Mr. Adkins, has shipped between 500 and 600 tons of lead ore and concentrates during the year.

Rose and Daisy. Situated on the ridge between the Columbia and Spillimacheen rivers at a point almost opposite Castledale. The property was bonded to C. H. Rowley last fall, and 100 feet of tunnelling was done in an effort to develop some small

surface showings. The results did not come up to expectations and the work was abandoned. Elsewhere on the property there is a strong surface showing of low-grade lead ore, on which work recently done by the owners is reported to have given excellent results. R. W. McKeeman, of Castledale, is the principal owner.

Castledale. Consisting of two claims owned by W. Logan. Considerable tunnelling was done on this property by C. H. Rowley. In these workings the vein does not show continuity and only a few small pockets of quartz mineralized with chalcopyrite were encountered. It is now reported that the owner has found more ore at another showing, on which he has confined his attention during the season.

Prospecting was energetically carried out by F. P. Armstrong and his partner, J. G. Webster, under the returned soldier prospecting scheme put into effect this year by the Provincial Government. The areas prospected included the ridge between the Spillimacheen and the Columbia rivers and Vermont creek. Three claims were staked.

Captain Armstrong is also interested in the *Giant* mine near Spillimacheen, where there is a large deposit of barytes and low-grade lead ore. It is reported that Eastern capitalists have taken an option on the property and intend to mine the barytes on a large scale.

Marie Group.—Situated near Palliser. Preliminary prospecting-work done by the owner, O. W. Wiedman, consists of an open-cut on the vein, in which several quartz stringers carrying galena have been exposed. Some of the sorted ore ran: Silver, 2.4 oz.; lead, 66 per cent.; zinc, trace.

Eclipse Group.* This group, consisting of the *Eclipse* and *Eclipse* "*A*" claims, is owned by A. F. Macaulay, of Spillimacheen. The property is situated on the south-eastern side of Warren creek, which flows north-easterly into the South fork of the Spillimacheen river. The altitude of the upper workings is about 6,350 feet. In a direct line from the Columbia river the distance to the claims would be about 11 or 12 miles, but the present route is by sleigh-road 18 miles from Spillimacheen; thence by pack-trail about 5 miles, making a total of 23 miles from transportation. The more direct route, however, would involve crossing the low divide which separates the North and South forks of the Spillimacheen river, necessitating a circuitous route to obtain a favourable grade.

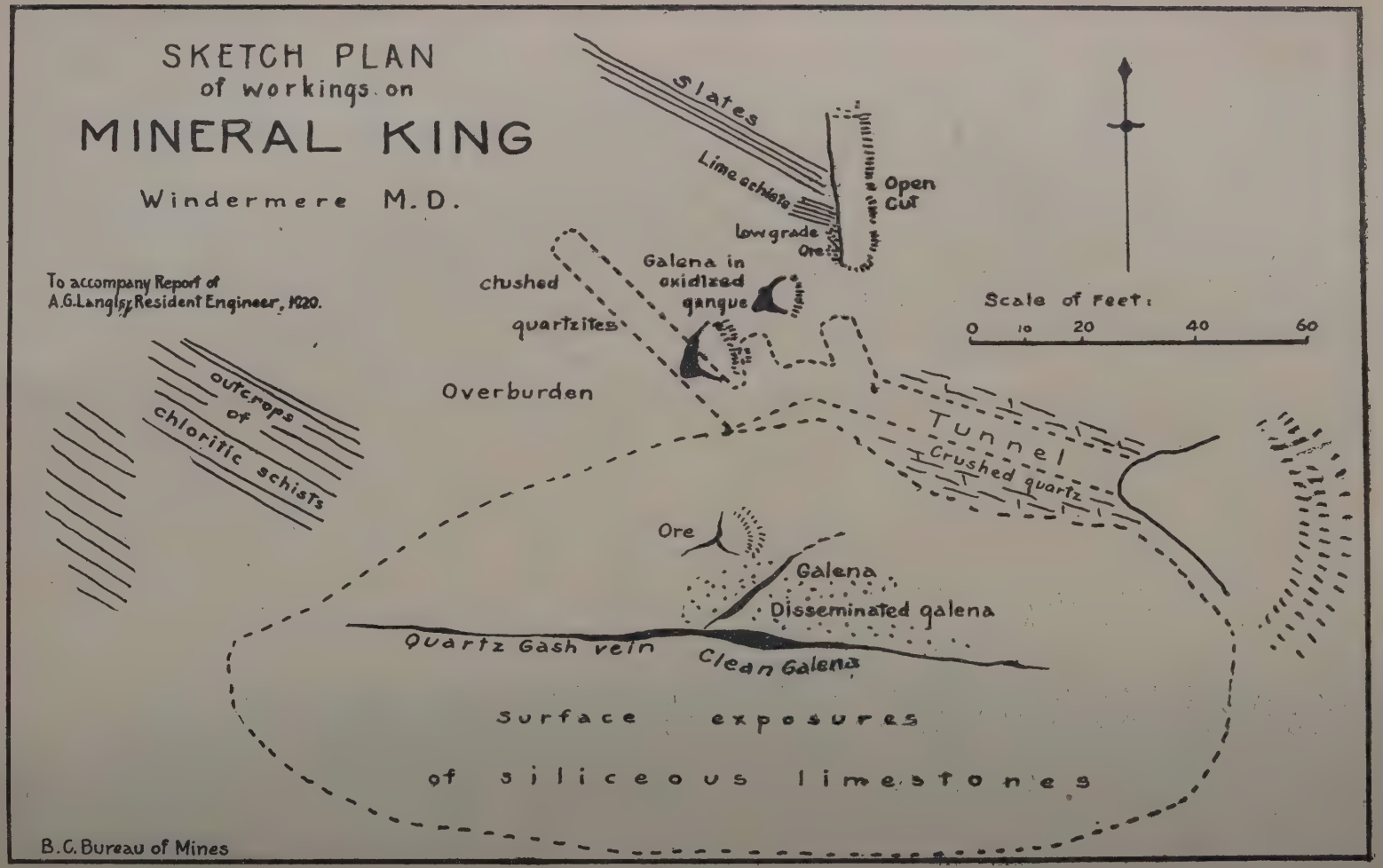
A quartz vein carrying chalcopyrite occurs in a fissured zone about 12 to 16 feet in width. The shattered material of this zone forms the ledge material in which the ore is deposited, chiefly on the foot-wall side. The country-rocks are schists and siliceous limestones.

The best showings are at the upper workings, where a band of solid ore from 16 to 18 inches in width is exposed in open-cuts about 50 feet apart. Samples taken at these places show 19.2 and 14.5 per cent. copper respectively. Between these showings there is a tunnel 35 feet in; this tunnel appears to have turned too far into the foot-wall, having failed to develop any ore. Farther down the mountain and about 300 feet vertically below this tunnel there is a showing of 12 inches of solid ore on the foot-wall side of the ledge, the adjoining 11 feet of quartz to the hanging-wall side being more or less impregnated with mineral. Just below this showing a tunnel has been driven 20 feet in the quartz. The mountain-side below the workings is strewn with boulders containing ore and ledge material amounting to a considerable tonnage.

The upper workings were roughly estimated by the writer to be about 1,000 feet above and 1,500 feet from Warren creek. If sufficient ore is developed to justify the erection of a concentrator a good site for it could be obtained on the creek below the claims.

Paradise. Work was greatly hampered by lack of men during the season, and the production was necessarily less than the average. Mining and development has principally been confined to the No. 4 level, from which a raise is being driven to tap the ore-shoot exposed below the No. 2 level. New ore-bodies have been developed between the No. 4 and the upper level, at a distance of 175 feet from the portal. These lower workings are still in the zone of oxidation, and the ledge-matter is composed of the same soft decomposed material as in the upper levels, though the ore carries a higher percentage of galena. A 5-ton White motor-truck was used for hauling the ore from the mine to the railway.

Bald Eagle. Situated on Slade creek to the north-west of the *Paradise*. John Burman, the principal owner, put in a season's work at the property. A width of from 2 to 3 feet of ore was encountered in a short crosscut from the main tunnel. It shows up strongly in the bottom, and in order to get under it an adit-tunnel is being driven 45 feet lower down.


SKETCH PLAN
of workings on
MINERAL KING
Windermere M.D.
To accompany Report of
A.G. Langley, Resident Engineer, 1920.
Slates
Lime schists
Open Cut
Low grade Ore
Galena in oxidized gangue
Crushed quartzites
Overburden
Scale of Feet:
0 10 20 40 60
Outcrops of chloritic schists
Tunnel
Crushed quartz
Ore
Galena
Disseminated galena
Quartz Gash vein
Clean Galena
Surface exposures of siliceous limestones
B.C. Bureau of Mines

The ore is a massive galena with which is associated zinc-blende and iron pyrites. A sample taken across a width of 2 feet assayed as follows: Gold, 0.02 oz.; silver, 11.4 oz.; lead, 33.5 per cent.; zinc, 20 per cent. A grab sample from a 10-ton pile extracted from the tunnel ran: Gold, trace; silver, 23.2 oz.; lead, 42.5 per cent.; zinc, 24 per cent.

The first attempt to develop the ore exposed in the upper tunnel was the driving of a 192-foot crosscut at a vertical depth of 80 feet below the showing; this proved futile, as it was not driven in the right direction to develop the projection of the ore. This tunnel has been abandoned, but may be of use at some future time.

Silver Belt. Situated in the basin to the south-west of the *Paradise* mine and at the head of Spring creek. The property was visited, but there was little to be seen, as the workings from which ore has been extracted, consisting of a long open-cut and several shallow shafts, had caved in, and there were no surface indications which could be taken as a useful guide to form an opinion of the character of the deposit.

Mineral King. During the season exploratory and development work were carried on by the Toby Creek Mining Company, of Vancouver, which recently acquired the property under option. The property was examined on May 28th, at which time not much work had been done by the Company. The claims are located on the southerly slope of the ridge which forms the divide between Toby and Jumbo creeks at a distance of approximately 26 miles from the railway at Athalmer. The elevation of the workings is 5,500 feet, or 1,200 feet above the level of Toby creek. The hillside, which has a fairly uniform slope of about 30°, is devoid of timber in the vicinity of the workings; below this few rock-exposures are visible on account of the heavy covering of the detritus from the bluffs which form the summit. Ample water power is available for mining or milling purposes on a large scale from the near-by creeks. Mining-timbers can also be obtained within a short distance.

To reach the property a motor-car can be taken for the first 18 miles from Athalmer and horses for the remaining distance. An old road used by a lumber company still exists on the southerly side of Toby creek, but at present is impassable for vehicular traffic on account of the bridges being washed out. However, this road could be put into first-class condition at a moderate expense in proportion to its length, and an excellent grade for haulage purposes could be obtained.

The formation of the hill consists of vertical bedded schists, quartzites, slates, narrow bands of limestone, and squeezed conglomerates having a north-westerly strike. Judging by the highly metamorphosed and contorted nature of the rocks in the vicinity of the deposit, there has been a shearing and crushing movement on a large scale. An examination of the surface exposures shows the ore to consist principally of galena, with which is associated zinc-blende and iron pyrites in varying quantities, and to have been deposited in quartz-filled gash-fissures in a highly silicified limestone, some of which carry lenses of clean galena, while in places the country-rock has been impregnated with disseminated galena. Small pockets and bunches of galena are also found in the adjoining crushed and decomposed ledge-matter. Altogether, across a width of about 60 feet there are a number of nice surface showings, but the entire width could not be considered of high enough grade for mill-feed. The writer would classify the deposit as being of the replacement type, formed along a sheared contact of limestone and slate.

The continuity of the limestone, which forms an isolated knoll on the hillside and probably the hanging-wall of the deposit, could not be traced on the surface of the hillside either above or below its occurrence. The surface exposures as described above are confined to a limited area, including and adjoining the knoll of limestone.

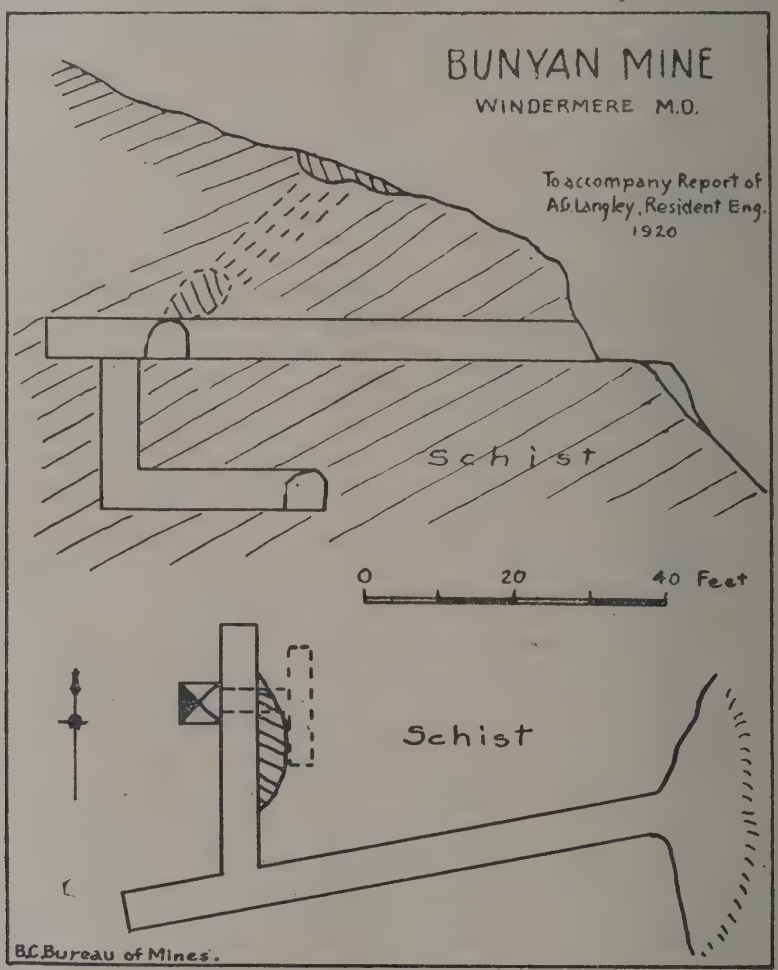
The old tunnel driven into the hillside for a distance of 120 feet, and vertically about 50 feet below the surface showings, did not develop the ore-showing exposed on the surface, and further crosscutting was recommended, which, according to recent reports, opened up a good width of clean galena. Other work done on the surface is reported to have met with very satisfactory results.

Samples taken of the best grade of ore, as exposed in various open-cuts across the apparent strike of the ore-body, ran as follows: Gold, trace; silver, 33.4 oz.; lead, 57.4 per cent.; zinc, 4.8 per cent. A grab sample from a small pile of iron pyrites from the tunnel ran: Gold, trace; silver, 0.8 oz.; zinc, 4.8 per cent.

Work on the property was suspended for the winter months, but it is understood that the company is very well satisfied with the results obtained by the work done during the year, and that operations will be continued in the spring.

Bunyan Group.

This property is situated at a distance of 7 miles from Invermere, at the head of Goldie creek, and is easily accessible by a good wagon-road. During the year it was bonded by the original owners, W. W. Taynton, J. H. Taynton, and associates, to E. J. Fader, and work was started in the fall. On the shoulder of a bluff which rises some 300 feet above the upper bench-lands of the Columbia several outcrops of copper-stained schist and barytes are exposed in shallow open-cuts. In order to develop this surface showing a 60-foot tunnel was driven into the face of the bluff, gaining barely 30 feet in depth. The tunnel crosscuts a schist formation, shot with stringers and lens-like inclusions of barytes; at 60 feet in a drift was run under the surface showing and an irregular-shaped body of ore was struck. This has been stoped to a height of 15 feet above the floor of the drift.



The roof of the stope represented approximately an area of 6 by 14 feet, and from this a sample was chipped at random from a number of different places, the result being as follows: Gold, trace; silver, 2.8 oz.; copper, 3.58 per cent. The ore here consists of disseminated grey-copper in a finely brecciated ground-mass, consisting of small fragments of country-rock cemented together with silica and barytes. The formation has a strike of N. 25° W. and dips into the hill at an angle of 45° to the south-west.

Captain Fader conceived the rather unique idea that the most economical way in which to mine the ore would be to blow off the shoulder of the bluff with one big blast. The blast had the effect of badly mixing up the ore and waste, so that sorting was made extremely difficult and the resulting product was very low grade.

Paradise Mine, Windermere M.D.

Millie Mack Mine, Arrow Lake M.D.

Surface improvements include additions to the bunk-house, a 600-foot 2-bucket tramway, and ore-bins. Two car-loads of ore was hauled to the railway by 6-ton Packard motor-trucks.

It is reported that shipments have been suspended and that future development will be principally confined to the driving of a lower crosscut at a point 100 feet below the present workings.

Nip & Tuck.

This property, comprising two claims—the *Nip & Tuck* and the *Silver Tip*—is situated at an altitude of 8,900 feet above sea-level. The mine cabin, having accommodation for four men, stands on a barren hillside at a short distance from the workings. A road formerly built to the *Ptarmigan* mine camp ends within about a mile of the workings, and for this latter distance there is a good rawhide trail. The total distance from the railway is approximately 28 miles. Operations are being carried on by a syndicate under the terms of a lease and bond. R. H. Perry had charge of the work.

The formation, consisting principally of limestone, has apparently been tilted vertical, forming a rugged and jagged peak, the easterly shoulder of which joins the glacier-covered summit of the divide between Slade and Law creeks. The workings are situated on the westerly side of this peak in the face of a precipitous bluff.

Snow prevented an examination of the surface showings, but the vein is said to be traceable to the glacier, near which good ore is exposed on the surface. Ore also outcrops near the summit of the peak, where 140 sackfuls had been extracted from shallow surface diggings. In order to handle this a wire had been strung to the portal of the lower tunnel, from whence it was planned to string another wire to the main trail in the basin below.

Work was being confined to driving an adit on the lead, which had previously been prospected by two short tunnels, 20 and 30 feet respectively higher up the hill. Snow and ice prevented an examination of these workings, so all that could be seen was the lowest tunnel then being driven. It was in 68 feet and had a direction of S. 35° E. The ground was frozen within a few feet of the face and the sides and roof were covered with frost crystals.

At the face ore was beginning to make its appearance, and a sample taken across 12 inches gave the following results: Gold, 0.02 oz.; silver, 25.8 oz.; lead, 8.8 per cent.; zinc, 0.7 per cent. A grab sample from a few sacks of ore taken from one of the upper tunnels ran: Gold, 0.02 oz.; silver, 74.1 oz.; lead, 44.7 per cent.; zinc, 1 per cent.

The group is located on the continuation of a well-mineralized zone extending from the *Ptarmigan* in a south-easterly direction. There are many difficulties to contend with, to say nothing of the hardships to be endured in mining at this altitude, and it is to be hoped the efforts will be fully justified by the results of the work now being done.

Iron Cap.

This property, situated at an elevation of 9,000 feet, lies between the *Ptarmigan* and the *Nip & Tuck*. Many years ago a considerable amount of tunnelling was done, presumably to develop ore exposed near the portal of the upper tunnel and the ground underlying an iron-stained capping. This work principally consisted of three tunnels driven from the surface at vertical intervals of 100 feet. The lowest is in about 350 feet, the next about 200 feet, and the uppermost 400 feet. Near the portal of this latter tunnel a small lens of ore was encountered having a north-westerly trend and a dip apparently to the south-west. At a distance of a few feet in a 60-foot winze was sunk, from which ore is said to have been extracted. This is now full of ice. Past the winze there is no evidence of a vein and no ore has been developed.

The ore is galena, with which is associated a large percentage of iron oxide and a little zinc-blende. A sample over a width of 3 feet ran: Gold, trace; silver, 24.3 oz.; lead, 17.3 per cent.; zinc, 0.6 per cent. The ore probably owes its occurrence to the replacement of limestone in a sheared zone along a line of faulting.

It is doubtful from the development whether those who previously operated the property ever understood the nature of the deposits encountered in this formation, for the exploratory work does not seem to have been guided by good judgment.

During the season J. L. McKay and G. Larrabee did some work at the upper tunnel under a lease, and also extracted some ore from a near-by claim called the *Hell Diver*.

Ptarmigan.

This property, which was visited in 1903 by W. Fleet Robertson, the Provincial Mineralogist, is fully described in his report for that year. Information regarding the workings and the value of the ore mined might be obtained from E. J. Scovil, of Golden, who is agent for the owner. The property was visited by the writer, but could not be properly examined, as the tunnels were nearly filled with ice; access

was, however, gained to the lower level by crawling over 150 feet of ice, which almost completely filled the tunnel. When once inside the workings were found to be dry and in first-class condition; even the equipment, consisting of mine-track, air-pipe line, ventilating-pipe, ore-car, and small air-hoist, was in a good state of repair.

A lot of tunnelling has been done, which conveys the impression that there was a lack of systematic development. It would appear that the mountain has been cut transversely by a fault having a south-easterly trend, along which shearing has taken place; in this sheared zone ore has been deposited in small fissures and as irregular-shaped bodies replacing the limestone. The logical way to explore this ground would seemingly be to drift in the direction of the fault-strike and crosscut at intervals. The dump from this level is large, but by far the greater bulk is of waste material, although there may be 700 to 1,000 tons which might be worth careful sampling should the property be reopened. A grab sample from the surface of this portion of the dump ran: Gold, 0.02 oz.; silver, 15.3 oz.

Early in the year about 250 tons was hauled from the lower terminal of the tramway and shipped to Trail. The principal values were in silver, which averaged about 25 oz. a ton. This was second-grade ore sent over the tram and dumped outside the bin. There is about one car-load remaining. The bunk-house at the mine and the buildings at the compressor plant were in a good state of repair.

Tatler Group.

This group, owned by R. S. Gallop, comprises twelve claims and is situated at the head of the South fork of Horsethief creek at a distance of approximately 40 miles from the railway at Athalmer. To reach the property the Horsethief road is followed from Wilmer and for the first 20 miles is in good condition; past this point the remaining 4 miles of road is only just passable for a wagon. The remaining 12 miles is covered by a trail, and the mine cabin is finally reached at an elevation of 7,200 feet. In spite of the distance the trip is an easy one, for there is no hard climbing, the valley-grades being gradual.

It is difficult to imagine more beautiful scenic surroundings than those passed through on the way to this property. The magnificent waterfalls, high rugged peaks, glaciers, and the park-like valleys are most impressive. In places on the main creek wide areas of the valley-floor have been covered with alluvial soil. The land so formed appears to be very fertile, judging by the crop of grass in evidence. It is free from timber and a large percentage of it would appear to be arable.

Rock-exposures noted on the way indicated the formation to be composed largely of argillites, limestones, quartzites, and schists. A quartz agglomerate similar to that on Slade creek near the *Trojan* was noticed exposed on the Horsethief Creek road.

One of the most striking geological features is the occurrence of a large mass of intrusive granite, which forms a high mountain on the north side of the creek at a point about opposite the confluence of McDonald creek. A dyke from this batholith invades the sedimentary rocks on the south side of the creek, but does not appear to extend for any great distance. The country around the marginal contact of this intrusive mass should receive close attention from the prospector.

For many years R. S. Gallop has been doing exploratory work on a number of copper-showings exposed on the higher altitudes of the mountain which forms the divide between the headwaters of the south fork of Horsethief and Jumbo creeks. His efforts have largely been confined to surface diggings, with the ultimate object in view of being able to show up enough ore to justify the development of the property on an extensive scale by some large company. Having only limited capital, and being further handicapped by the shortness of the season at the high altitude, the work has necessarily been slow and laborious; still, a considerable amount of open-cutting, trenching, and tunnelling has been accomplished.

The formation of the mountain consists of beds of limestone, slate, sandy shales, and quartzites; the structure is anticlinal, the top of the arch forming the summit of the mountain. The action of erosion, due to frost and glacial ice, has left the summit and the upper slopes covered with a thick layer of slabs of shale, limestone, and angular fragments of quartzite, which have greatly added to the difficulties of tracing the continuity of the various showings.

The folding of the strata has apparently been responsible for the formation of small vertical fissures, the more pronounced of which are quartz-filled and mineralized with chalcopyrite, iron pyrites, and a little grey-copper. Although these fissures, which have been prospected

on the lower slope of the mountain, can be traced for a considerable distance, they are narrow and, taken individually, do not give promise of any large tonnage. Higher up the mountain numerous surface diggings have uncovered ore of varying grades and quantity.

At an altitude of 8,900 feet a strong showing of ore has been uncovered. Here a deep open-cut exposes a face 8 feet wide and about 20 feet long. Although it is difficult to arrive at the exact nature of this deposit on account of the adjacent rock-surfaces being completely covered with loose material, it appeared to be in the form of a bedded fissure, having a north-westerly strike and a dip of 25° to the north-east. Other exposures around the contour of the hill would sustain this theory.

From this cut some 20 tons of ore has been extracted. A grab sample from the ore pile assayed as follows: Gold, trace; silver, 10.2 oz.; copper, 4.5 per cent. The ore carries the bright-blue stain of azurite along the fractured surfaces. This was the strongest showing seen by the writer, and at this point further work seemed advisable in order to uncover the vein and to demonstrate the extent and character of the deposit.

Farther up the mountain, approaching the summit, a number of scattered diggings expose copper indications and a little ore, but enough work has not been done here to prove the existence of any well-defined ore-body or to enable one to establish a connection between the various workings. A sample of ore from one of these showings ran: Gold, trace; silver, 6.8 oz.; copper, 3 per cent. From the summit, which is covered with glacial ice, an excellent panorama can be obtained of the surrounding country, the elevation being 9,300 feet.

At present work is being confined to driving a tunnel into the face of a bluff situated a short distance from the cabin and at an elevation of about 7,500 feet. This tunnel is being driven to develop a vertical quartz-filled fissure which is distinctly outlined in the bluff. At a short distance above the tunnel this vein has a width of 15 inches and is mineralized with chalcopyrite and iron pyrites. A sample of this ore ran: Gold, a trace; silver, a trace; copper, 2.3 per cent. While a sample across a streak in the tunnel ran: Gold, trace; silver, 13.8 oz.; copper, 3.6 per cent.

In order to mine ore of this character at so great a distance from transportation a large tonnage is essential, and in the writer's opinion future efforts should be concentrated on the development of the largest and strongest showings. In the event of extensive mining operations being carried on, there are no serious obstacles to prevent the construction of a road at a suitable grade. There is plenty of mine-timber handy, while water-power is available at no great distance.

Lead Queen.—During the year the lower crosscut was continued and the vein tapped at an additional depth of 75 feet. The drift along the vein at this level is reported to have a nice showing of ore in either face. Work has been suspended for the winter, but, according to the manager's statement, will be continued next spring.

Isaac.—This property was acquired by Paul Denhart last year from H. E. Forster, of Wilmer. A shipment of 62 tons of silver-lead ore was made to Trail. It is recently reported that parties interested in the *Nip & Tuck* have acquired this property.

FORT STEELE MINING DIVISION.

This Division easily leads all others in tonnage produced for the year, and yet it has only three or four properties on the shipping-list. One of these properties—namely, the *Sullivan*—is responsible for the bulk of the production and is one of the greatest deposits of zinc-lead ore on the continent. It is interesting to note that previous to the operation of this property one of the largest producers of silver-lead ore the district has ever had was the *St. Eugene* at Moyie, which is situated at a distance of 32 miles in a south-easterly direction from the *Sullivan*.

The *North Star*, situated close by the *Sullivan*, is the only other large shipper at the present time.

The fact that such large deposits have been found to exist upon the development of ordinary surface showings tends to enhance the possibilities of prospects in adjoining areas where geological conditions are similar.

There are a great many prospects scattered throughout this Division, but in the majority of cases not enough work has been done to prove the persistency of the veins or the definite boundaries of the ore. It is gratifying to note that this year has witnessed increased outside interest in the Division, and general activity among the prospects has been more pronounced.

The Prospectors' Association, under the secretaryship of J. F. Hutchcroft, has been active in giving useful information and advice regarding various properties and best way to reach them.

Sullivan. Good progress has been made by the Consolidated Mining and Smelting Company, of Canada, Limited, in development and mining operations. The lower tunnel is now in over 8,000 feet, and is still being continued to strike the ore proved by the diamond-drilling done from the upper workings. A raise connecting the upper and lower workings has been completed. Labour was scarce during the summer and early fall. Shipments were curtailed during the first four months of the year owing to a strike called by the O.B.U. Shipments for the year 1920 were as follows: Zinc ore, 242,229 tons; lead ore, 13,214 tons; iron pyrites, 4,300 tons.

North Star.—This property, which is the second largest producer in the East Kootenay, has been operated steadily during the year and made shipments of about 6,600 tons of silver-lead ore, consisting principally of carbonates.

St. Eugene.—Situated at Moyie. This property has been operated since May 1st by the Consolidated Mining and Smelting Company, of Canada, Limited. The approximate tonnage produced is 700 tons of lead ore and 300 tons of zinc ore.

Society Girl.—Situated near Moyie. After many years of unproductive activity it is now reported that a nice shoot of silver-lead ore has been struck and a car-load shipped to Trail. It is to be hoped that this will mark the beginning of a period of prosperity for the owners, who have been so persistent in their endeavours to make a mine of the property.

Victor.—Situated on Maus creek near Fort Steele. Development has been actively pushed on this property and a 50-ton concentrator is now nearing completion. The ore is galena, with which is associated zinc-blende.

Placer-mining.—Placer-mining has been fairly active throughout this Division. On Wildhorse creek the Gamble Mining Company, which was operating a monitor on some virgin ground, had a successful run, which unfortunately was limited to a very short period owing to a break in the pipe-line and shortage of water. Improvements now made should allow them a full season's run next year.

The Wildhorse Dredging Company, which has also been operating on this creek, ceased operation for some time pending a reorganization of the company. It is reported that his has been accomplished and it is expected that the company will be operating next season.

On Perry creek A. J. Palmquist has completed the flume and installed monitors. A preliminary test is said to have yielded a nice return of fine gold.

Coal.—Robert Strachan, the Senior Inspector of Mines, reports that work has been steady throughout the Crowsnest coalfields, with the exception of a two-week strike in October at Coal Creek and Michel.

At Coal Creek and Michel the mines are all in good condition and no new developments have been made.

At Corbin work has been continued fairly steadily, the large portion of the coal coming from the Nos. 3 and 4 mines, while some preliminary work has been carried out at Nos. 5 and 6, which are new mines. During the greater part of the year labour has been scarce.

Indications of fresh developments in the Upper Elk coalfield have been in evidence during the past few months, a party having started to reopen the holdings of the Northern Coal Company, but owing to lack of labour the work was discontinued until next spring.

Federal Group. Located within a short distance of the Kootenay Central Railway and on Skookumchuck creek. When visited in May the group of claims were as follows: *Rob Roy*, *Eureka*, *Federal*, and *Victory*. The property is being operated by the Globe Mining Company, of Vancouver, which is capitalized at $250,000. D. A. McIntosh is president and W. H. Wooley secretary-treasurer.

The formation in which the deposit occurs is of sedimentary origin and schistose in character, due to a crushing and shearing produced by a thrust along a fault-plane, which latter is well defined at a short distance to the west of the tunnel-site. Copper was first found associated with oxide of iron in this sheared zone near the edge of the creek, and though the steep rocky bluff rises to a height of about 100 feet above this point, there is no apparent evidence of the continuation of the deposit in a vertical direction. At a short distance down the creek the stain of cobalt bloom is noticeable in the calcareous talus accumulated at the foot of the bluff.

A few feet above the creek a tunnel 75 feet in length has been driven into the bluff in a direction of S. 20° E. This tunnel does not reveal any ore of economic importance, except that of the original discovery near the portal. At a distance of 15 feet from the face a 2-compartment shaft had been sunk at some previous time to a depth of 22 feet. This shaft was full of water. At 10 feet from the portal the present company has sunk an incline winze, which at the time of examination was down 30 feet, the bottom being almost vertically below the edge of the creek-bed.

As far as could be ascertained, this winze followed a shoot or chimney of soft talcose material stained with limonite, the iron probably originating from an adjacent body of pyrrhotite. In this soft material native copper has been deposited in thin layers and groups of arborescent crystals, from which some beautiful specimens have been obtained. The copper thus formed is probably of secondary origin, having been precipitated from solution in percolating waters by the action of the iron oxide. The primary source of the ore possibly is not far distant. Near the bottom of the winze the ore shows a width of about 4 feet, but its extent can only be defined by further work.

The sheared zone apparently extends across the creek, where the opposite bank exhibits decomposed and iron-stained material. A sample taken across a width of 4 feet assayed as follows: Gold, trace; silver, trace; copper, 11 per cent. A grab sample from small dump ran: Gold, 0.04 oz.; silver 0.4 oz.; copper, 6.7 per cent.

Since the examination was made a short stretch of road has been built connecting the workings with the main road, and a compressor and pump have been installed.

Bull River Iron-Deposits.

Situated near the summit of Mount Fenwick at an elevation of 6,500 feet. The property comprises a group of seven Crown-granted claims and fractions covering an area of 375 acres. Access can be gained from the town of Bull River, on the Kootenay Central Railway, by wagon-road for 6 miles to the base of Mount Fenwick, and thence by trail which follows a fairly steep and uniform grade to the old cabin situated at an elevation of about 6,000 feet, or 4,000 feet above the railway. The circumstances under which the examination was made were not favourable. The trip was arranged to be taken with Mr. Fenwick, who is thoroughly familiar with the ground and the work which has been done. Unfortunately he was unable to accompany me at the last minute, and Archie Douglas, who acted as a guide to the property, did not have any knowledge of the extent or location of the various workings. So the following report will be confined to the general impressions gained by the writer and will not include a detailed description of the various workings and exposures.

Making an early start from the Douglas ranch, situated at about 2 miles from the base of the mountain, the old cabin was reached by noon, which only allowed a short time on the claims. The base of the mountain consists of sedimentary rocks of Cambrian age, including slates, shales, and quartzites; the upper portion of the mountain, including the summit, is capped with arcenaceous shales and dolomitic limestones, in which latter the ore-deposits occur.

This formation has a strike of N. 20° W. and a dip of about 30° to the east. Along the ridge of the summit at an elevation of 7,000 feet the exposed rock-surfaces are cracked and shattered, due to the action of erosion, conditions which are generally found at these altitudes. On the north-easterly side the mountain falls off abruptly, forming a series of steep jagged bluffs, down some 600 feet to a basin in which several small lakes can be seen.

The workings are mostly confined to the south-westerly side and are scattered over a large area, from the summit to 900 feet below. The hillside, covered with grass and underbrush, is sparsely timbered with small balsam and jack-pine, which would provide ample fuel for camp requirements.

Traversing the face of the bluff in a vertical direction, hæmatite-filled fissures can be distinctly seen. The fissuring has probably taken place along the line of fault-fractures. These fissures have a strike almost normal to that of the formation, and theoretically it would seem reasonable to assume that they formed the main channels for the mineral-bearing solutions which have replaced porous and more easily soluble bands of the country-rock. Hence, if this theory is correct, where the zone of fissuring crosses bands of easily replacable rocks the ore may be expected to spread out in the form of a bedded deposit, and as far as the writer was able to ascertain this is what has happened.

The old trails have become obliterated, and although travelling is easy, it is difficult for a stranger to locate all the numerous diggings, and the time available only allowed a cursory examination of those on the *Hematite* claim.

Varying thicknesses and grades of ore can be seen at nearly all the open-cuts which have been driven into the face of the hill, and by means of which the ore has been traced for a considerable distance. At one of the most easterly workings, there is exposed in the face of a cut a width of 10 feet of ore, which was the strongest and most promising-looking showing seen by the writer. A grab sample from a dump of about 30 tons ran as follows: Iron, 51.6 per cent.; phosphorus, trace; silica, 22.2 per cent.; sulphur, 0.68 per cent. The best grade of ore is a massive blue hæmatite, running about 68 per cent. metallic iron and 3 per cent. silica.

Further exploratory work would appear advisable, but just where and how this should be carried out can only be determined by an extensive examination and careful study of the geological conditions. This work should be done with the view of proving the existence of a sufficient body of ore of suitable grade to warrant the large expenditure which would be necessary to provide power and transportation facilities in order to carry on mining operations on a large scale. Abundant power is available at Bull River falls, at a distance of 3 miles, while the property is within a reasonable distance of the railway.

The development of a large body of hæmatite ore within a short distance of the Crowsnest coalfields would certainly prove a most valuable asset to British Columbia.

Achilles Group. Sometimes known as the *Evans* group owing to the fact that C. and W. Evans, of Marysville, have been actively engaged on the property for a number of years. It was reported on by J. D. Galloway in 1915 in the Minister of Mines' Report for that year. At the time that it was visited by the writer during the past season weather conditions unfortunately only allowed a hurried examination of the claims in Pollen basin, and prevented an examination of the showings on the other side of the ridge in what is known as the Kelly basin. Hence no further report will be made until the claims have been thoroughly examined. The following remarks regarding the accessibility to the property may be of use to those wishing to make the trip.

The claims are situated at a distance of approximately 22 miles from Marysville. Starting from Cranbrook, the camp can easily be reached in a day, as a good road follows up St. Mary river as far as Meacham's ranch at the west end of St. Mary lake; from here the river can be crossed on a log-jam, from which point a good trail leads to the cabin near Fiddler creek, a distance of about 6 miles. An alternative route is by trail for 10 miles from the easterly end of St. Mary lake. The elevation of the property ranges from about 6,000 to 7,000 feet, and on account of its altitude can be seen to best adantage from the latter part of July to about the middle of September.

Whitefish Group. This group, consisting of three claims, is owned by C. Hungerford Pollen. It is situated at a short distance above Whitefish creek and close to the trail leading to the *Achilles* group, at an elevation of 5,400 feet. The surface exposure consists of a strong outcrop of quartz mineralized with iron and copper sulphides and occurring in the face of a bluff composed of gabbro. A tunnel driven for 163 feet developed the vein for the first 35 feet in, at which point a 20-foot winze was sunk. In the side of this winze the ore shows a width of about 3 feet. It is authoritatively stated that ore shipped from here yielded about 6 per cent. copper and 6 oz. in silver.

Blue Peter Group. This group, consisting of four claims and a fraction, is owned by C. Hungerford Pollen and is situated near the head of Alki or John creek, at a distance of about 3 miles from the wagon-road. The cabin, which is in a good state of repair, is conveniently situated to the workings. At a short distance above the creek a 100-foot tunnel has been driven to develop a strong surface showing of iron-stained ledge-matter. In the tunnel the mineralization occurs as bunches and disseminations of iron and copper sulphides. The ore consists of chalcopyrite associated with pyrrhotite and iron pyrites in a siliceous gangue. The vein occurs in a diorite sill and has probably been formed along a fault-fracture, through which highly siliceous mineral-bearing solutions have circulated, filling the interstices and replacing the country-rock.

A grab sample from the surface of a small dump ran: Gold, trace; silver, trace; copper, 2 per cent. No doubt much higher values could be obtained by careful sorting. A lower tunnel was started, but abandoned before it penetrated the surface wash.

Mystery. This property was visited on the way down the creek, but, as it was beginning to get dark, time only allowed a hurried inspection of the tunnel, which has been driven into the hillside for a distance of about 180 feet. From what could be seen the ore occurrence is similar to that at the last-mentioned property. Iron and copper sulphides occur associated with quartz and filling the interstices of the country-rock adjacent to the vein.

A grab sample from the surface of the dump, roughly estimated to contain 250 tons, ran: Gold, trace; silver, trace; copper, 6.8 per cent. There is said to be a series of veins which have been prospected by other workings.

WEST KOOTENAY DISTRICT.

AINSWORTH MINING DIVISION.

Near Ainsworth.

Florence.—Under the management of H. Hewer, this mine has been worked continuously during the year, although, in common with other properties, operations were somewhat curtailed owing to scarcity of labour. An average crew of forty-five men was employed.

No. 1.—Operated by the Consolidated Mining and Smelting Company of Canada, Limited. Shipments for the year amount to 700 tons. The property has recently been leased to Thos. Hawes and associates.

Highland.—Operated by the Consolidated Mining and Smelting Company. The mine was closed down in March. Some 200 tons of silver-lead ore was shipped to Trail.

Spokane-Trinket was steadily operated during the year under the management of J. McDougal. Approximate tonnage shipped, 450 tons.

Krao.—Some exceptionally high-grade silver ore was shipped from this property. The total production for the year was approximately 125 tons.

Ruth.—Work was continued by W. A. Smith and associates on the old tailings-dump, from which they have shipped about 250 tons.

Other properties which have made small shipments are *Twin* lease, *Tariff*, *Maestro*, *Little Phil*, and *United*.

Skyline. This well-known property, belonging to A. W. McCune, comprises the following claims: *Skyline*, *Perhaps*, and *Morning Star*. It is situated at an elevation of 5,000 feet and at a distance of 6 miles from Ainsworth. It was worked in the early nineties, the ore being shipped partly to the Pilot Bay smelter and partly to American smelters.

An extract from the Provincial Mineralogist's report of 1896 is as follows: "The smelter returns from seventy-four lots or over 2,000 tons in 1895–96 assayed from 35 to 149 oz. in silver, or an average of 54 oz. a ton, and less than 5 per cent. lead, and of the large amount shipped during 1896 the silver varied from 51.5 to 74.5 oz. of silver a ton, or an average of 58 oz. a ton." The mine is reported to have been closed down in 1896. The report further states that the workings then included an incline 87 feet deep, sunk on the lead, and a shaft farther to the west 200 feet deep, from the bottom of which a drift 120 feet in length and an upraise 40 feet led to the incline and the stopes. The writer has not been able to find any record of more work being done until 1917, when A. W. McCune decided to drive a long crosscut to tap the vein about 450 feet below the surface at the old workings. Up-to-date buildings were erected, including a roomy bunk-house, cook-house, stables, and blacksmith-shop.

The crosscut was driven and the vein was encountered at a distance of approximately 1,200 feet from the portal. The formation in the tunnel consists of bands of siliceous limestones and crushed slates of the Slocan series. The vein, or what is taken for the vertical extension of the vein, is a fractured zone consisting of crushed country-rock, being more or less cemented with calcite and silica. This has been drifted on for some distance, but only small values have so far been encountered. The crosscut extends past this zone, but there are no further indications of vein-matter. The work was abandoned in 1918, when pipe-lines, track, ties, and, in fact, everything that was movable was taken away.

The upper workings are mostly caved in and it was only possible to get a little way down the old incline shaft. Here small sections of the ground which had not been stoped showed a similar structure to that in the low tunnel, except that the rock was more decomposed owing

to processes of oxidation, and in places it was well mineralized with impregnations of the ore-minerals. The richest ore, being disseminated galena and grey-copper in a quartz gangue, is characterized by bright blue and green stains on the fractured surfaces. A sample across a 1-foot streak of ore of this character taken in the incline shaft ran: Gold, 0.01 oz.; silver, 364.2 oz.; lead, 12.5 per cent.; zinc, 3.5 per cent.

The following is an extract from the report of R. G. McConnell, of the Geological Survey, made in 1895: "The deposits appear to occupy fractured zones of considerable but unknown width, traversing the limestones and slates in nearly a north-and-south direction and dipping to the west. The zones have been silicified and impregnated with ore in a selective manner by ascending solutions. The ore occurs in flattened ore-bodies, occasionally 10 or 12 feet in thickness, which, in the case of the *Skyline*, according to Scott MacDonald, the manager, often cross nearly horizontally from the foot-wall to the hanging-wall." From the above it is reasonable to conclude that further ore-bodies may be expected in the fractured zone, and that exploration from the lower tunnel in a vertical direction is advisable.

The property is now being worked under lease and bond by R. Sheridan, E. Mathews, M. Hamilton, and J. Sime, who during the season have confined their attention to mining ore from the surface and from the upper part of the old workings, from which they have shipped about 150 tons.

During the winter, work is being pushed on a 2-compartment upraise from the lower tunnel to connect with the old workings. This was started on October 12th, and on January 8th it was reported to be up 160 feet.

Riondel Camp.

Bluebell. Mining operations during the summer months were largely confined to mining ore from the glory-hole and surface of the hillside. In this connection it is peculiar that in the early history of the property much oxidized ore lying at and near the surface was overlooked, when it could have been used to good advantage at the old Pilot Bay smelter. S. S. Fowler has been able to ship large tonnages of this material at a time when the ore from the lower levels was unobtainable on account of water. In order to cope with the water in the lower levels additional pumping plant has been installed, and it is reported that satisfactory progress has been made towards unwatering this part of the mine. This year's output exceeds considerably that of 1919.

Tam O'Shanter.—A little work has been done on this property and a shipment of 56 tons made to Trail.

Kirby Group. This property, consisting of a group of six claims, was staked by A. J. Curle, of Kaslo, in the spring of 1919. It is situated within a quarter of a mile from Kootenay lake and at a short distance in a north-easterly direction from the old *Bluebell* mine. The surface of the hillside, which has a gentle slope towards the lake, is well covered with overburden and a growth of small timber, conditions which add to the difficulties of prospecting.

The formation, consisting of dark schists, quartzites, and highly metamorphosed limestones, has been intruded by dykes of rocks. In the immediate vicinity of the outcrop few rock-exposures are visible, while the topographical features do not allow any appreciable depth in the prospecting-tunnels, although good backs could be obtained should conditions warrant the driving of a long crosscut. The vein as exposed in a 55-foot crosscut shows a width of 10 feet of sparsely mineralized quartz, with a narrow band of ore on the hanging-wall side and small bunches and stringers of galena on the foot-wall. It has a strike of north and south, a dip of 35° to the west, and occurs as a bedded fissure. On the foot-wall side the vein has been drifted on for about 70 feet, while farther up the hillside ground-sluicing has uncovered several stringers of ore and indications of mineralization.

The ore is galena, with which is associated zinc-blende and spathic iron in varying quantities. Some very high silver values have been obtained from small seams carrying ruby-silver. The general run of the ore carries good average values in silver and lead, but on account of its high zinc-tenure would have to be carefully sorted before shipment.

The preliminary work done by A. J. Curle and his partner, R. Guthrie, has of necessity been confined to shallow workings, and the property has now reached the stage where expenditure on a somewhat larger scale will be necessary to carry on further exploitation.

Gwennie and Phyllis. These claims were staked by B. L. Eastman and R. D. Hearn, of Riondel, in 1919. They are situated on the hillside to the east of the *Bluebell* mine and at an altitude of 500 feet above Kootenay lake. Many years ago prospecting-work had been done on them, consisting of a shallow shaft sunk on the vein and some open-cutting. This shaft is now full of water, but an open-cut 30 feet long which exposes the vein for this distance shows it to have a width of about 3 feet and to be mineralized with bunches and streaks of galena and zinc-blende in a quartz gangue. A tunnel has been driven at 55 feet below this showing, but at the time of examination it still had some 30 feet to go in order to get under the surface exposure.

The vein, which has a strike of east and west and a dip of 60° to the north, occurs along the contact of a dark fine-grained dyke-rock and quartzite. The ore is a mixture of galena, zinc-blende, and iron pyrites; the clean galena carries up to 60 oz. in silver, but unfortunately careful sorting and cobbing of the ore would be necessary to obtain a shipping product.

Duncan River District.*

Bonaventure Group.—Situated near Howser lake. This property has been worked during the year by the owners, LeBlanc & Senff, who have been busily engaged in driving a crosscut to tap the vein at depth.

Dary Group. This group consists of the *Dary* and *Dismuth* claims, owned by Mrs. I. Tapanila, of Kaslo. The workings are situated at an altitude of about 5,100 feet (aneroid) on the northern side of Bear creek, which flows westerly into the Duncan river at a point about three-quarters of a mile north of Healy Landing. In a direct line the workings are about 1 mile from the river, but the existing trail is probably about 3 miles in length.

The geological formation of this area embraces quartzites, limestones, argillites, and grey schists, classified as the Duncan series. Galena occurs in small shoots in a quartz vein the strike and dip of which appear to conform to that of the enclosing schists.

The old workings consist of an incline shaft on the *Dary* claim about 70 feet down on the dip of the vein (43° to N. 50° E.), near the bottom of which there is a 12-foot crosscut, and an incline shaft about 30 feet down on the vein on the *Dismuth* claim.

The vein varies in width from 10 inches to 4 feet, is well defined, and can be traced down and between the shafts, which are about 300 feet apart horizontally. A sample across 10 inches in the *Dary* shaft gave: Gold, a trace; silver, 40.6 oz.; lead, 14 per cent.; zinc, 4.4. per cent. A sample across 4 feet in the *Dismuth* shaft gave: Gold, a trace; silver, 14 oz.; lead, 7 per cent.; zinc, 1 per cent.

At the time of the writer's visit in June the *Dary* shaft was being unwatered and preparations were being made to continue development by H. Tapanila and two men employed by him. A windlass, Sibley ventilating outfit, and blacksmith-shop had been installed, and a new cabin had been erected recently to replace the one burned in a forest fire some years ago.

Bannockburn Group.—Situated on Hall creek. Alex. Smith, the owner, has had a few men employed at development-work.

Old Gold.—Situated at the head of a tributary to the West fork of the Duncan river. This property has been worked in a small way for many years, and some high-grade silver-lead ore has been packed out over the divide to Ferguson, a distance of 13 miles. During the present season a few men were employed.

Retallack.

Whitewater.—Mining operations were carried on principally by leasers, and a number of men were employed at winning ore from the old workings. Reports on hand show that 600 tons of ore was shipped, averaging: Silver, 80 oz.; lead, 27 per cent.; and 164 tons averaging: Silver, 15 oz.; zinc, 50 per cent.

Charleston Group.—This group was acquired by the Keystone Development Company from the original owner, A. J. Harris, who is in charge of the development. The claims are located near the *Whitewater* mine.

Meacher Group.—Situated at the head of Whitewater creek. The owner, Michael Wargo, put in a season's work at the property.

Wellington.—The Standard Silver Lead Mining Company put a crew of men to work at cleaning out the old workings, preparatory to making a thorough examination of the mine with a view to doing further development-work.

Mitford Group.—Situated on Goat creek. Recently bonded by A. J. Harris to the Mitford Mine Units Company, of Spokane. A few men have been employed at drifting on the vein below the old workings.

Fletcher Group.—Situated on Lyle creek and owned by A. H. Watkins. The old *Ibex* trail was reopened in view of proposed development. According to recent reports, a consolidation of the *Phoenix* and *Fletcher* groups has been effected and the properties bonded to Spokane interests.

Lincoln.—The development of this property has been continued by J. H. Thompson, of New Denver.

Helen Group.—Further work has been done on the property by the English Bros. and a new trail to Blaylock is being constructed.

Utica.—During the early part of the year this property was worked under lease by A. J. Poyntz and associates. A very rich shoot of ore was encountered in the old workings, the high silver values being in grey-copper and native silver. The leasers are said to have done exceedingly well.

South Fork of Kaslo Creek.

Silver Bell.—Mining and development work has been steadily carried on during the year and some 220 tons of high-grade silver ore shipped to Trail.

Silver Bear.—This property adjoins the *Silver Bell.* It was acquired during the year by M. S. Davys and associates. The season's work is reported to have been satisfactory and a small tonnage of high-grade ore has been shipped.

Index.—The long crosscut has been continued and other development-work carried on. A small shipment was made to Trail.

Revenue.

This property was recently bonded by E. J. Edwards, O. McDougal, and S. A. Williams from L. McLean and associates, of Kaslo. To reach the claims the wagon-road up the South fork of Kaslo creek is followed for a distance of about 10 miles from Zwicky. From a point near the end of the road a trail leads up the mountain-side for about 2 miles, and the mine cabin is reached after a climb of about 2,000 feet, making a total elevation above sea-level of 6,375 feet.

The formation is of granite and the vein occurs as quartz-filling in a fault-fissure, along which there is evidence of much movement; some of the wall-rock having a beautiful natural polish. The vein, which has a width of about 3 feet, shows marked persistency. It has a dip of 80° to the west and strikes in a northerly direction into the hillside, the slope of which, being about 40°, affords good depth with little drifting. The metallic contents are principally galena, zinc-blende, and iron pyrites, the gangue being quartz. A fairly clean shipping product can be obtained by sorting.

The vein has been developed by three tunnels. Time did not allow a survey of the workings, but the following measurements are sufficiently accurate to give an idea of what has been accomplished:—

No. 1 level has been driven for 180 feet on the vein and ore was underhand-stoped from a point near the portal. A sample across a width of 26 inches near the floor of the drift assayed as follows: Gold, 0.02 oz.; silver, 61.8 oz.; lead, 23.5 per cent.; zinc, 9 per cent.

The No. 2 level has been driven for a distance of 220 feet and gains an additional depth of 60 feet on the vein. Ore was also encountered in this level and a raise was driven to the No. 1.

The No. 3 level has been driven at a vertical depth of 200 feet below the No. 2 and is in 150 feet. Ore was encountered at about 100 feet from the portal and was raised on for 20 feet. Across the roof it shows a width of 8 to 12 inches. A sample across 8 inches ran: Gold, 0.02 oz.; silver, 61.8 oz.; lead, 12 per cent.; zinc, 14.5 per cent. The average value of 50.9 tons shipped during 1913 and 1916 was: Silver, 74.6 oz.; lead, 49.8 per cent.; zinc, 7.97 per cent.

At a distance of about 300 feet in a westerly direction there is evidence of another vein, but as yet very little exploratory work has been done on it. A sample taken across 6 inches at the face of an open-cut gave the following returns: Gold, 0.02 oz.; silver, 25 oz.; lead, 17.5 per cent.; zinc, 3.5 per cent.

The trail to the property was improved and a small crew of men was put to work during the summer.

Gold Cure Group.—Recently acquired by the Marsh Mines and Development Company, of Kaslo. A small crew was employed at the property this summer.

Black Bear.* This mineral claim is owned by Charles Sampson, of Kaslo, and O. B. Gerard, of Toronto, and was recently bonded by A. H. and T. H. Hansen, of Kaslo. The property is situated at an altitude of about 3,650 feet on the northern side of the South fork of Kaslo creek, about 400 feet vertically above the creek, and is easily accessible by a short trail from a point on the South Fork wagon-road about 8½ miles from Kaslo.

The ore is found in shoots in a quartz vein which occurs in the rocks of the Slocan series, the strike and dip of the vein appearing to conform to that of the enclosing schists. The ore consists of galena and iron pyrites in a quartz gangue. The old workings consist of a shaft about 35 feet down on the dip of the vein, which is 67° to N. 65° E., and a short crosscut tunnel below the shaft, which was being driven to intersect the vein and an open-cut about 50 feet north-easterly from the shaft and 20 feet vertically above it.

The width of the vein in the shaft varies from 12 inches at the surface to about 19 inches near the bottom, but water at the bottom of the shaft prevented an inspection of the face. The shaft appears to be in ore for about 30 feet from the surface. There was said to be a showing of ore in the open-cut, but this was inaccessible owing to a cave-in of the bank above. A sample across 19 inches near the bottom of the shaft gave: Gold, 0.08 oz.; silver, 5.3 oz.; lead, 15 per cent.; zinc, 3.6 per cent. A grab sample from a small pile of sorted ore gave: Gold, 0.02 oz.; silver, 25.5 oz.; lead, 56 per cent.; zinc, 2 per cent.

At the time of the writer's visit in June the work done by the Hansen Bros. consisted in putting the old workings in shape to continue development.

Poplar.

Bullock Group. This property, consisting of three claims and a fraction, is situated at an elevation of 1,200 feet above the railway and at a distance of about 3 miles from Poplar. The claims are easily accessible by trail from the railway-track. The group was acquired by the Bullock Gold Mines, Limited, in 1919. The formation, generally speaking, consists of highly metamorphosed rocks, schistose in character and mineralized in certain zones with pyrite and arsenopyrite. The schists are rich in iron sulphides and evidently carry gold in appreciable quantities, as good results have been obtained in some places by panning the decomposed and oxidized material from the surface, and it is possible that if a big enough body of this material is discovered it could be mined and treated at a profit.

In this formation quartz veins and veinlets are of common occurrence, some cutting the formation and others following the schistosity of the enclosing rocks. The latter type show persistency along the outcrop, but their continuity with depth in this particular locality has not yet been demonstrated. They do not appear to be of the fissure type, but possibly owe their origin to segregation of quartz in the highly siliceous phases of the enclosing schists. The vein-filling is usually milky white quartz, although smoky quartz is sometimes encountered.

A good deal of prospecting and development work has been done on these veins in the vicinity of Poplar since the discovery of some exceptionally rich pockets of gold quartz in 1903. The company's efforts have largely been confined to exploratory work on veins as above described, and small pockets and stringers of galena have been exposed.

The principal underground work consists of a 287-foot crosscut tunnel, driven at a vertical distance of 50 feet below the outcrop of the vein, on which an old shaft had been sunk. The bottom of this could not be examined on account of water, but at the top the quartz vein showed a width of about 28 inches to be heavily mineralized with iron sulphides, which are oxidized at the surface. A general sample of this oxidized material taken from a number of places along the outcrop ran: Gold, 0.40 oz.; silver, 1.2 oz.; copper, trace; lead, *nil;* arsenic, trace. The vein was not encountered in the tunnel, which lies a little to the north-west of the shaft.

Some samples taken near the shaft, which the manager had assayed, ran high in arsenic. As there seemed to be some doubt regarding the value of this, it may be well to mention that

the value of refined arsenic is quoted at from 12 to 15 cents a pound. In October the Tacoma smelter was paying about 2 cents a pound for 80 per cent. of the arsenic content.

During the season two excellent cabins, 16 by 20 feet each, were built and a good trail was constructed. Four or five men were employed at development-work.

Crowned King Group.—Situated near the Bullock Gold Mines' property. It is reported that this property has been purchased by C. Hanson, of Poplar, and W. H. Rhomberg. It is understood that a little work was done and good gold values are reported to have been recovered from some of the schist.

Mobb's Mine.—Situated near Poplar. Recent work has been confined to driving a crosscut to tap the vein at a vertical depth of about 200 feet below a showing of galena in an old shaft. The workings are within a short distance of the railway and less than 700 feet above the track.

Among others who have been mining and prospecting around this district are: J. McDonald, who has a property at Gold Hill; P. Kelly, who owns the *Telluride* group near Poplar; A. Hanson, who is interested in the *Rio Tinto* and other properties; Dick Roberts, who has been interested in claims on Canyon creek for many years; and Osten Foss, who has properties up the Duncan river.

SLOCAN MINING DIVISION.

As previously stated in this report, the strike called by the O.B.U., which took effect on May 1st, greatly curtailed the production and hampered the operations of the various mining companies. The Rosebery-Suprise Mining Company, which has been one of the leading producers during recent years, operated the *Bosun* and *Surprise* mines and the *Ivanhoe* and *Canadian* groups from the first of the year until May 1st, since which time they dropped their options on the two latter properties and have only done a small amount of development at the *Surprise*, where the No. 4 level is being advanced.

At the *Bosun* work was resumed in a small way on June 1st and has been gradually increased, the number of men employed at present being twenty-five. A raise connecting the No. 6 and No. 4 levels has been completed and a No. 5 level started from half-way up the raise. Drifting and stoping from this level have been carried on with good results. This ore will be treated at the company's mill at Rosebery, which has only been run intermittently during the season.

The production in 1920 was as follows: *Surprise*, 2,176 tons; *Bosun*, 2,395 tons; *Ivanhoe*, 45 tons; *Canadian* group, 105 tons.

Clarence Cunningham reports that little progress has been made since May 1st and does not look for any marked increase in activity at the various properties operated by him until the spring of 1921. The production of the *Queen Bess* and his other properties was: Crude ore, 939 tons; lead concentrates, 1,148 tons, zinc concentrates, 1,702 tons.

Silversmith Mines, Ltd. This company operated steadily during the year. The continuity of the large ore-body which was developed last year on the 1,000-foot level has been proven on the 500-foot, 800-foot, and 1,100-foot levels. In places the stope from the 800-foot level is between four and five sets wide. Shipments for the year 1920 exceeded 1,700 tons of silver-lead ore and concentrates.

Noble Five. Under the management of Paul Lincoln, work at this property during recent years has been confined to the development of the vein system at depth, connecting the lower with the upper workings by means of a 1,000-foot raise and establishing intermediate levels. The erection of a 100-ton concentrator was started in 1919 and completed during this summer. Other improvements include the erection of a modern bunk-house and buildings, which provide excellent accommodation for the men. Being short of men in the mine on account of the strike, the mill was started up on ore from one of the old dumps, and the first car-load of silver-lead concentrates was shipped to Trail in the fall.

Rambler-Cariboo.—This property was also hard hit by the strike, and consequently its production shows a marked decrease.

Carnation.—Situated near Sandon. Development-work was carried on under the management of G. W. Clarke, who had a few men employed until the strike closed down operations temporarily. The results so far obtained are said to be of a very satisfactory nature.

Payne.—It is reported that the Pacific Mines Development Company has taken a bond on the property, following an examination made by W. J. Elmendorf. It is understood that the preliminary work will be confined to the lowest level of the mine.

Among the numerous activities of leasers and small operators around Sandon the following have been reported: *Washington* and *Silver Reef* groups, worked by M. Monahan and partner and one car-load of ore shipped; *Last Chance*, worked under lease by R. Cunning and 26 tons of ore shipped; *Victoria*, worked by J. Worgan, the owner; *Cinderella*, worked by G. Dean; *Black Colt*, worked by Geo. Petty. Leasers have also been active in the old workings of the *Payne* and *Hope*.

Molly Hughes.—Situated on Slocan lake near New Denver and owned by H. Clever. Thirty-three tons of high-grade ore shipped to Trail.

Mowitch. This property was worked by Joe Beber and associates. It is situated at a distance of 6 miles from New Denver, the tunnel-sites being only a short distance above the new wagon-road to Three Forks. The vein is a small well-defined quartz-filled fissure in a massive slate formation. It has a strike of N. 35° W. and almost a vertical dip. It is developed by two adit-tunnels at a vertical distance of 80 feet apart. The ore is a "dry ore" carrying high values in silver. Thirty-four tons was shipped to Trail in 1920. This was transported by means of a wire cable stretched from the tunnel to bins by the railway.

Rosemarie Group. This group, adjoining the above-mentioned property, was also worked by Joe Beber. The vein, which has a width of from 3 to 6 feet, cuts a slate formation. The uppermost tunnel at which work was being done was driven on the vein for a distance of 40 feet. This tunnel gains little backs in this distance. Ore was encountered near the face. The ore is a fine-grained galena, with which is associated zinc-blende. A sample from a pile of several tons assayed as follows: Gold, trace; silver, 44 oz.; lead, 37 per cent.; zinc, 16 per cent. Below this work was also being done in an old tunnel from which a few tons of shipping-grade ore had been extracted. This tunnel could not be examined on account of powder-smoke.

California group, near New Denver, was worked under lease by W. Eccles and George Doyle.

Marion.—Alex. Ferguson, the owner, continued development-work.

London Ridge.

This ridge, rising to an elevation of 7,000 feet, forms the divide between Seaton creek and Kane creek. The ores from this locality, unlike the characteristic ores of the Slocan, are "dry ores," carrying high silver values and little, if any, lead. Many old locations were made over this area, from which high-grade ore has been extracted from time to time. Among those upon which recent work has been done and which are now being developed are the following:—

McAllister. This property, comprising a group of three Crown-granted claims and a fraction, was acquired by R. A. Grimes in 1919, who formed a company, the Slocan Silver Mines, Limited, with a capitalization of $250,000. Stock was subscribed for by a number of prominent business-men of the Prairie Provinces, and it is understood that ample funds are available for carrying out an extensive programme of development and for the erection of a mill when it is considered that sufficient ore has been blocked out.

The ore is a "dry ore," the principal value being in silver, which occurs as argentiferous grey-copper. The ore is disseminated throughout the white quartz of the vein, and although high-grade ore can be sorted from certain small enriched sections of the vein, the general run of the mine is clearly of milling grade. During the early history of the property the treatment of this class of ore no doubt presented a serious problem on account of the loss by sliming of the grey-copper, which would necessarily accompany crushing, and the concentration by water, but since the advent of the oil-flotation process this loss can be eliminated.

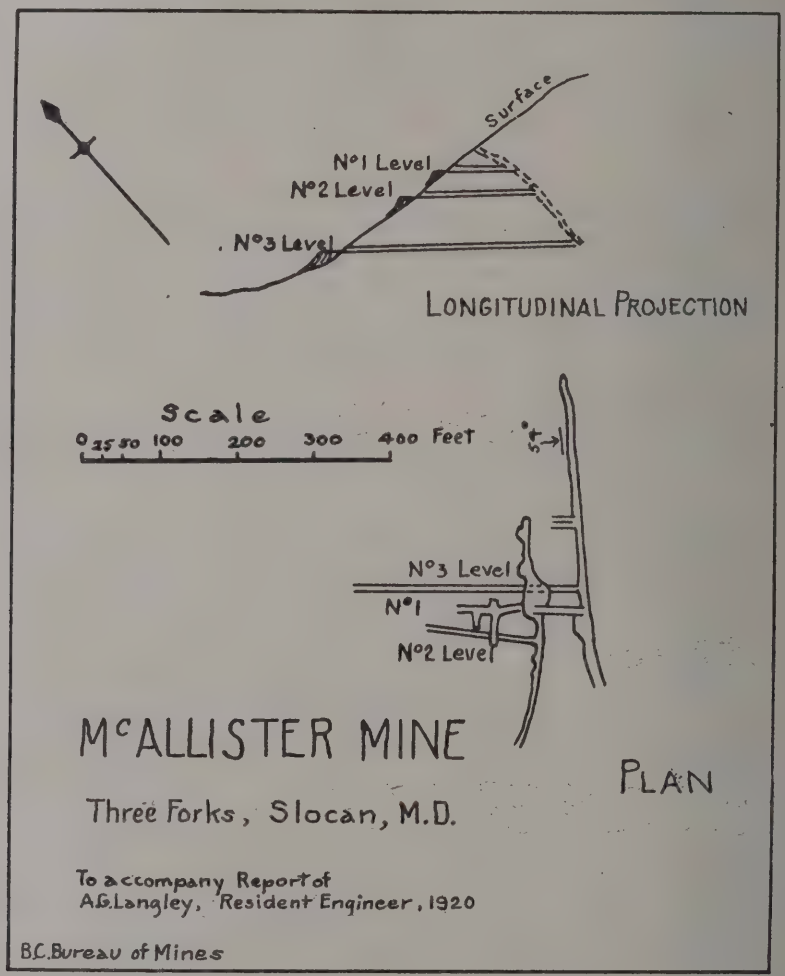
The work done by the present company has been principally confined to exploratory work on the surface and to the development of the vein on the lowest or No. 3 level by means of drifting in either direction and resting on the ore. No power being installed at the mine, all drilling is done by hand, which necessarily makes progress slow. During the year the strike called by the O.B.U. greatly hampered operations. On the No. 3 level the vein is strong and well defined, though at the northerly end of the drift faulted ground was encountered for a distance of about 40 feet, after which the vein was again picked up, and it is now reported that good ore is showing in the face of the drift.

The length of the ore-shoot and the average values of the ore which might be expected between the No. 2 and No. 3 levels can only be determined by systematic sampling, as the

occurrence of the metallic contents is inclined to be spotty and, to the eye, deceptive, for in places where there is little visible evidence of mineralization often good values are obtainable on assay.

Most of the ore has been stoped from the ground so far developed on the No. 2 level, and although the vein varies greatly in width, it apparently has an average of at least 2 feet, while the length of the ore-shoot is about 70 feet.

On the No. 3 level the vein shows a width of from 3 to 5 feet, and as practically no stoping has been done from this level there remains about a depth of about 85 feet of virgin ground on the dip of the vein between the two levels.



The ore-shoot above referred to seemingly has a rake to the north and near its southern extremity a raise connects the two levels. A sample taken near the bottom of the raise across 38 inches ran: Gold, trace; silver, 22.2 oz.; zinc, 1 per cent. A sample taken about half-way up the raise across a width of 40 inches ran: Gold, trace; silver, 37 oz.; and across 16 inches of crushed quartz above the top of the raise on No. 2 level ran: Gold, trace; silver, 14.2 oz. A grab sample of cobbed ore from the sorting-table ran: Gold, 0.04 oz.; silver, 335.2 oz.; zinc, 1.4 per cent.

Additional accommodation has been provided for the men, and it is understood that development-work will be carried on during the winter months.

Good progress was made on the Government wagon-road up Kane creek, which no doubt, will be of great benefit to this property and all others operating in this vicinity.

Miner Boy.—This property, which is situated on the summit of the ridge above the *McAllister*, has been idle for a number of years; it was acquired last year by Thos. Trenery, of Rosebery. Rails and equipment were taken up to the property and development started.

Milton Group.—Situated at a short distance to the north of the *McAllister*. Development-work was continued by R. McPherson, who has been interested in the property for many years and has accomplished a phenomenal amount of development-work single-handed.

Panama.—Situated on the Seaton Creek slope of the ridge. The owner, H. Giegerich, of Kaslo, is reported to have had several men working.

Silver Glance.—This property, which is also situated on the Seaton Creek slope, is owned by J. W. Power. A small shipment was made to Trail.

Silverton Camp.

Near Silverton there has not been the usual activity. The Standard Silver Lead Mining Company has curtailed its operations and only had a small crew employed at development and exploratory work.

Bosun. Since acquiring this property in 1917 the Rosebery-Surprise Mining Company has treated a large tonnage from the old dumps at the mill near Rosebery, and has extracted a considerable quantity of ore from the old workings. In order to gain depth on the vein a 3,000-foot adit-tunnel was driven from near the lake at a vertical depth of 250 feet below the No. 4 level. Near the end of this tunnel a width of about 4 feet of vein-matter was encountered. A raise from this point disclosed some good ore, and an intermediate level has been started half-way up to the No. 4 level. In this latter level, from which the ore has now been depleted, the ore occurrence was remarkably persistent for a length of 1,280 feet, and it is to be hoped that further work will prove similar conditions to exist with increased depth. Latterly about twenty-five men have been employed.

At the *Hewitt* a long crosscut tunnel was driven to tap the vein at depth, but since the strike was called in May there has not been much activity at the property; the same applies to the *Van-Roi*.

Ed. Shannon put in a season's work at the *Anaconda* group, which is a new prospect. Stripping and open-cut work has disclosed a strong showing of low-grade silver-lead-zinc ore.

The *Comstock* made a small shipment.

REVELSTOKE, TROUT LAKE, AND LARDEAU MINING DIVISIONS.

The unusual shortness of the season in this northern part of the district greatly limited the time for prospecting and mining activities at the higher altitudes. No new developments of importance have been reported from among the prospects, although in most cases results have come up to expectations, while mining operations on a larger scale have not been very active, with possibly the one exception of the old *Lanark* mine near Laurie, on the main line of the Canadian Pacific Railway, where a crew of eighteen men was steadily employed during the summer months. Work was confined to the development and stoping of the new ore-shoot encountered on the No. 4 level. Two car-loads of silver-lead concentrates was shipped to Trail. It is understood that during the winter months further tunnelling will be done under contract. The mine is operated by the Lanark Mining Company, of Yakima, of which W. B. Dornberg is president and manager.

Crystal Group.—This group, adjoining the *Lanark*, was bonded by B. E. Taylor, of Nelson, from the Kennedy Estate and J. McKinnon, of Revelstoke. Prospecting and development work was done during the season. Results are said to have been encouraging and work will be continued next spring.

Waverly-Tangier Group.—This property is situated near the head of the North fork of the Illicillewaet river, at a distance of 30 miles from Albert Canyon, on the main line of the Canadian Pacific Railway. G. H. Walters, of Spokane, who acquired the property in 1918, had a couple of men cleaning out the old tunnels preparatory to doing further mining and development work.

Two parties of returned soldier prospectors were sent out by the Provincial Government up the Big Bend district north of Revelstoke. One party devoted the time to prospecting around Goldstream and Smith creeks; the other went up Downie creek. In all seven claims were staked.

Beatrice.

This property, consisting of the two claims—*Folsom* and *Edmond*—is situated at the head of Mohawk creek at an elevation of 7,000 feet. There is a good trail leading from Camborne to the mine cabins, the distance being 7 miles. Operations were started by the New Era Mines, Limited, of Vancouver, in the fall of 1919 and continued with a small crew of men until late in the present year, when work was suspended.

The formation consists of contorted schists and crushed carbonaceous slates. Except at the outcrop, there is no indication of a vein on the surface, and nothing much to guide one as to the direction of the possible continuity of ore, although the crushed zone extends in a north-easterly direction from the outcrop, which would appear to be the most favourable locality to do further exploratory work.

Ore was first discovered by two inexperienced prospectors. It outcropped as a small chimney of clean galena at the contact of the schists and crushed slate, and gradually lengthened out as depth was obtained. A 30-foot shaft was sunk on this ore, which was further developed by a 200-foot adit-tunnel, known as the No. 1 level.

Altogether some 300 tons of high-grade silver-lead ore was extracted from these workings, which only gained a total depth of 40 feet on the vein. As the topographical features were not favourable for obtaining increased depth by tunnelling from this side, the No. 2 level was driven from the opposite of the butte at a vertical depth of 150 feet below the No. 1 level. Here some 800 feet of tunnelling has been done, comprising a lot of unnecessary and useless work. However, the ore was eventually picked up, and latterly several nice showings have been exposed by H. E. Bodine, who was in charge of the work. In this connection it may be mentioned that the present company has principally confined its attention to cleaning out the old workings and developing the exposed ore-bodies.

The ore is massive, consisting of a finely crystalline mixture of galena and zinc-blende, fairly free from gangue material. It carries high silver values, but unfortunately is very zincky, even some of the most carefully sorted ore running as high as 25 to 30 per cent. zinc, which makes shipment to Trail prohibitive. The following samples were taken:—

Across a width of 2 feet exposed in the face of a 20-foot raise from No. 2 level: Gold, 0.06 oz.; silver, 69.8 oz.; lead, 16.1 per cent.; zinc, 31 per cent.

Sample across a 2-foot width of a small lens of ore exposed in the roof of a drift on No. 2 level: Gold, 0.03 oz.; silver, 29.8 oz.; lead, 7.2 per cent.; zinc, 16 per cent.

Sample across a width of 1 foot exposed along the roof of an intermediate level 50 feet above No. 2 level: Gold, 0.02 oz.; silver, 44.4 oz.; lead, 17 per cent.; zinc, 20 per cent.

Sample of sorted ore for shipment: Gold, 0.075 oz.; silver, 82.5 oz.; lead, 25 per cent.; zinc, 28 per cent.

It will be noticed from the above that in each case the percentage of zinc predominates over that of the lead.

The ore occurs in the crushed slates along and near a schist contact.

During the season a light 2-bucket tramway was installed to connect the No. 2 level with recently constructed bins on the main trail. Improvements were also made to the trail and everything was got in readiness to rawhide ore during the winter, but presumably the high zinc contents prevented satisfactory market arrangements being made.

At the *Berniere* group, which is situated near Camborne, preparations were made to provide accommodation and facilities for a small crew of men by J. A. Darragh, representing Eastern capitalists, who have recently bonded the property from C. Menhinick, the owner.

Geological survey work was done during the season in the Trout Lake and Lardeau Divisions by M. F. Bancroft and party, of the Canadian Geological Survey Department.

In the Trout Lake Division mining activities did not show any marked improvement over those of 1919.

From the *Nettie L.* a small tonnage was shipped by leasers.

S. Cavanaugh was working under a lease at the *Silver Cup*.

At the *Parrsboro*, which is situated near the latter property, the crosscut tunnel started in 1919 by two men, under contract, to tap the vein at depth reached its objective in the fall. There is reported to be a nice showing of ore at the intersection.

At the *Crescent*, which is situated near the head of 8-Mile creek, the development of the vein with depth is reported to have met with satisfactory results. M. Leahy, of Trout Lake, is in charge of the work.

Noble Five Concentrator, Sandon.

St. Mary Lake, Fort Steele M.D.

Mrs. Jowett, of Trout Lake, who, as usual, spent part of the summer prospecting in the hills, claims to have found some sperrylite (platinum arsenide).

NELSON MINING DIVISION.

The activity both by the larger mining companies and the small operators has shown a decided increase as compared with that of 1919. Should the results of the present developments come up to expectations, the output of the district for 1921 should show a decided increase, more especially in gold and silver.

Yankee Girl. Situated at Ymir. This property was acquired in 1911 by the Hobson Silver Lead Company and was operated continuously until 1918. In the spring of the present year the Canada Mining Corporation took it under option after an extensive examination had been made by their consulting engineer, A. W. Newberry. A systematic plan of development was laid out and a crew of men was put to work early in the year.

The record of the mine is good, as it has produced a large tonnage of shipping-ore, while a considerable quantity of milling grade has accumulated. According to figures submitted, the tonnage shipped in past years is as follows: Up to 1911, 8,060 tons; 1911 to 1913, 4,720 tons; 1913 to date, 10,905 tons; the total representing a gross value of $470,000 in gold and silver.

The present work being done by the Mining Corporation of Canada is to prove the continuity of the ore from the lowest level to the upper workings, and at the same time to explore new ground with the ultimate object in view of developing sufficient ore to warrant the erection of a concentrator.

The ore varies in character, though the great bulk of it carries high percentages of pyrite and pyrrhotite, with which are associated galena and zinc-blende in varying amounts. The average values of the above-mentioned shipments of 10,905 tons were submitted to be as follows: Gold, 0.70 oz.; silver, 3.34 oz.; lead, 1.44 per cent.; zinc, 5.50 per cent.

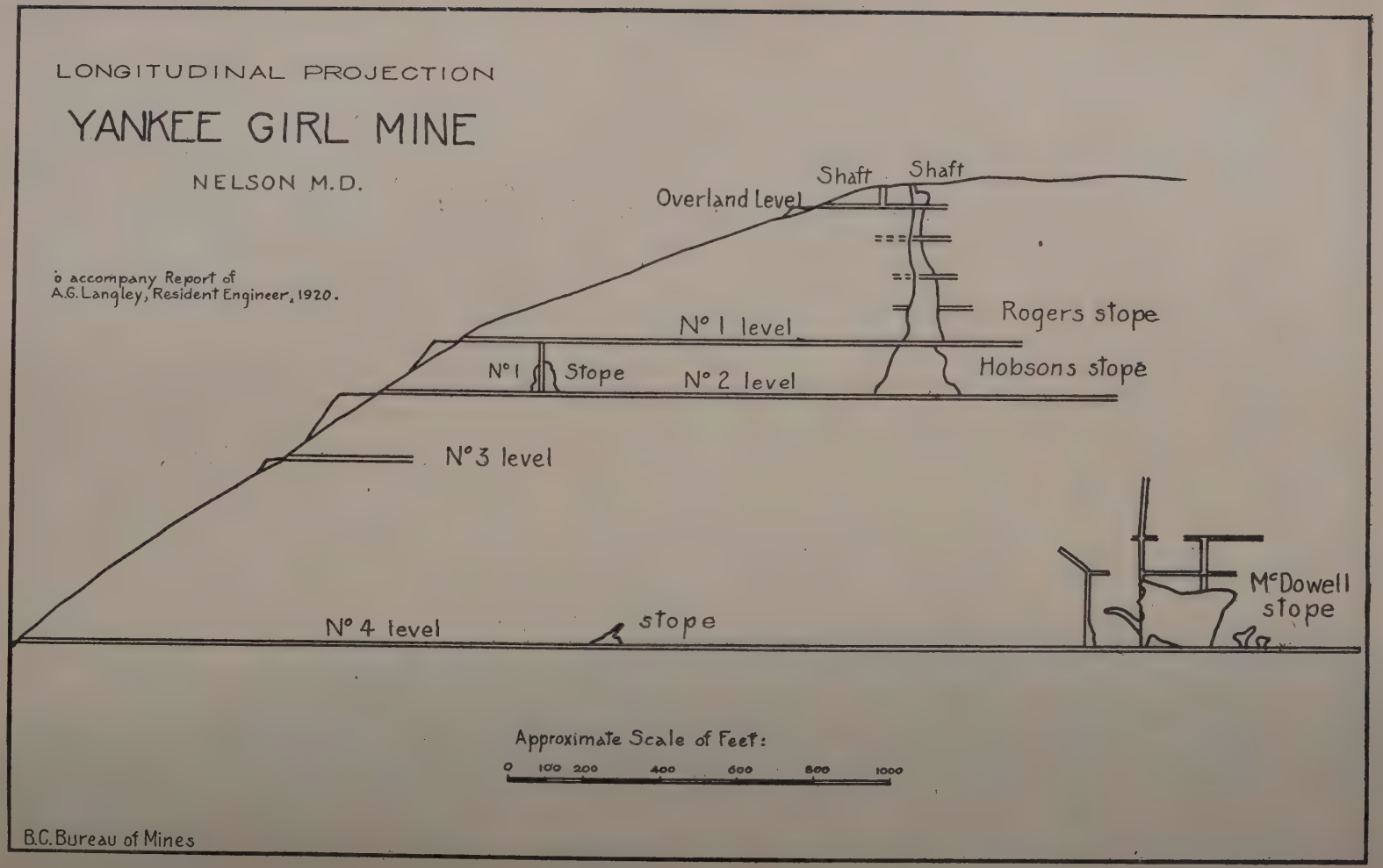
The formation of the mountain-side on which the mine is situated covers an area of marginal contact between the Nelson batholith and the schists and argillites of the Pend d'Oreille group of rocks; the granite forming a series of tongue-like intrusions into the adjoining formation. Ore-deposition has taken place along the line of a fault-fissure, which cuts both the granitic intrusions and the schists. The ore-bodies have been found to occur where the fissure traverses the granite; here highly siliceous mineral-bearing solutions have filled the zone of fissuring and replaced the country-rock to form ore-bodies of considerable extent. The strike of the ore-body on the lowest level is N. 68° E. and dip 65° to the north-west. The schists have a northerly strike and a dip of 60° to the west.

The original owners who staked the claims in 1899 exposed the vein by a series of open-cuts and drove the Overland tunnel, which gained a depth of 50 feet on the vein. Here the ore showed a width of 2 feet and a length of 40 feet. From these workings high-grade gold ore was shipped. The development was continued at depth by other adit levels as illustrated in the sketch accompanying this report. The upper workings are connected by a 2-bucket tram to bins at the upper terminal of the aerial tramway to the railway.

The No. 4 adit-tunnel was commenced in 1914 and is now in 4,050 feet. This develops the vein at a depth of 1,235 feet on the dip or 700 feet below the Hobson stope. The tunnel passes under the vertical projection of this shoot, and no ore-body of importance was encountered until a distance of 3,400 feet from the portal had been gained, where the McDowell stope was started. The length of this stope is about 300 feet and its width 9 feet. The walls of the vein are firm and massive and there is little danger from sloughing or caving.

Over 500 feet of virgin ground between the top of this stope and the ore-body on the next level was probably one of the most important factors which influenced the decision of the present company to take hold of the property. The result of the development-work done by them above this stope is not known at the time of writing. Near the end of the No. 4 level the *Yankee Girl* vein intersects and apparently becomes absorbed by what is known as the Lakeview vein, which has a strike of N. 40° E. and a dip of 55° to the west. It shows up strongly in the roof of the drift at a short distance beyond the McDowell stope.

Since writing the above it is reported that the company has suspended operations, and it is authoritatively stated that during eight months the following work was accomplished: 10 feet of sinking, 2,060 feet of drifting and crosscutting, and 670 feet of raising. This work was


LONGITUDINAL PROJECTION
YANKEE GIRL MINE
NELSON M.D.
o accompany Report of
A.G. Langley, Resident Engineer, 1920.
Shaft
Shaft
Overland Level
Rogers stope
N° 1 level
N° 1
Stope
N° 2 level
Hobsons stope
N° 3 level
McDowell
stope
N° 4 level
stope
Approximate Scale of Feet:
0 100 200 400 600 800 1000
B.C. Bureau of Mines

confined to known ore regions and no new exploration was undertaken. Six cars were shipped from various places to determine the grade of ore that would break down in the vein for bulk shipments. The highest car-load ran about $36 in gold and silver a ton, two cars at about $20, two at about $11, and one at about $14 in gold and silver a ton. The lead content ranged from 2 to 7 per cent.

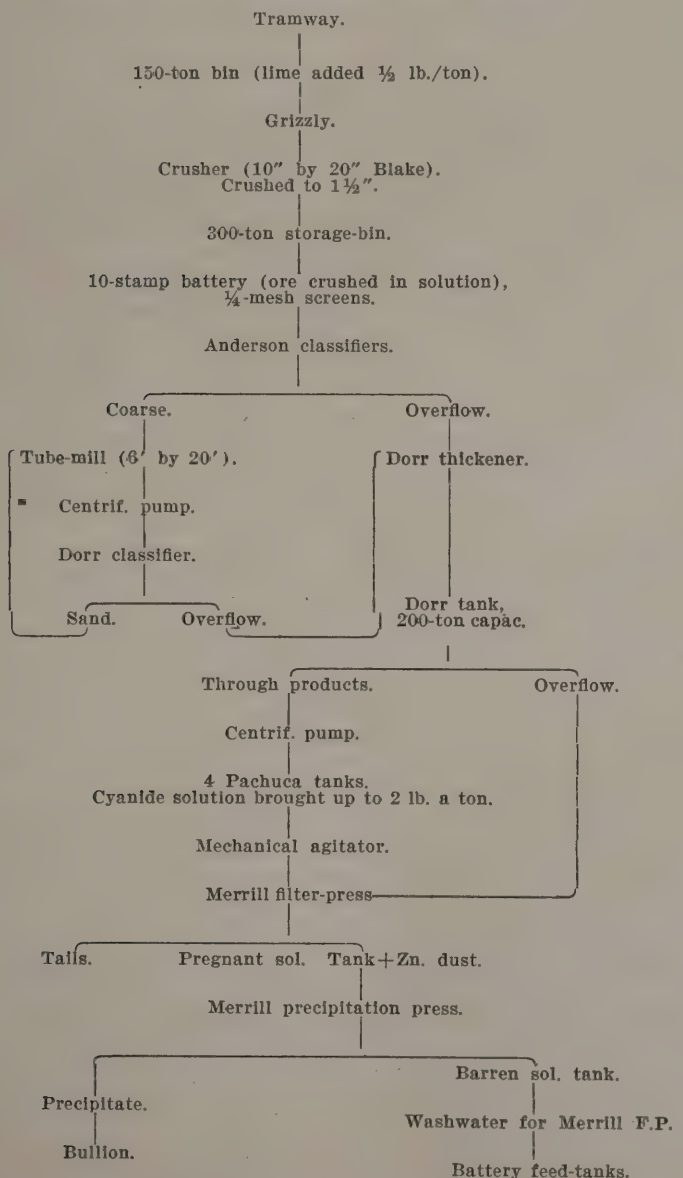
Sheep Creek.

Nugget and Motherlode.

These well-known properties have been frequently referred to in past reports of the Minister of Mines; that by J. D. Galloway in 1915 also gives an interesting table showing the production of the various Sheep Creek properties from 1900 to 1915. The *Nugget* and *Motherlode* mines are now being operated by the Nugget Gold Mines, Limited. The long crosscut driven from the lower level of the *Mother-*

Flow-sheet of Motherlode Mill.

(Capacity, 100 tons; extraction, 96–98 per cent.)



lode to tap the *Nugget* vein reached its objective early in the year, after being driven for a distance of 1,165 feet. This gives a depth of 625 feet of virgin ground below the old workings of the *Nugget*, or a total depth of about 1,000 feet below the apex of the vein. Good values were encountered at the point of intersection and a shoot of ore nearly 200 feet long was developed by drifting. The ore is a gold quartz similar in character to that of the *Motherlode* and to that encountered in the old *Nugget* workings. The quartz vein cuts laminated quartzites, which have a strike of N. 20° E. and a dip of 67° to the east.

Through these quartzites there is a heavy flow of water which seeps down between the laminæ and possibly has been an important factor in the enrichment of the vein. The mine is inclined to be wet, but the water has been a blessing in disguise, for, although there is no artificial ventilation in the stope, the air is good and becomes clear soon after blasting. The vein swells and pinches and its average width at any one place is not a safe criterion for what it may be in a few feet distant. The apparent average width of the stope at about 100 feet above the level was about 4 feet. The values are also variable, though the average is fairly consistent. During the season 4,657 tons was milled, yielding 1,584 oz. in gold and 408 oz. in silver.

Mining operations were carried on under somewhat adverse conditions, due to the scarcity of men and the high cost of labour and supplies. The mill was started up in July and closed down in November. During this period only sufficient ore was received to enable it to run for about 25 per cent. of the actual mining-time. The vein is being mined on the shrinkage system; hence, in order to supply the mill with its full capacity of 100 tons a day, it is necessary to mine about 300 tons. It is reported that stoping and development work are being carried on during the winter with a view of having everything in readiness for continual operation this season, when it is fully anticipated better results will be obtained.

Emerald.—The 50-ton concentrator installed at the property in 1919 was remodelled by W. de Witt and is now giving good satisfaction. The mine has been operated steadily, about fifteen men being employed. Ore and concentrates shipped to Trail amount to about 900 tons.

The *Molly Gibson*, owned and operated by the Consolidated Mining and Smelting Company, of Canada, Limited, was closed down on March 1st. Some 300 tons of silver-lead ore was shipped.

California.—Development-work has been steadily continued during the year and extensive improvements made to the *Athabasca* mill, which has been taken over by the California Mining Company. It is reported that the *Athabasca* mine has also been acquired by the company.

Perrier Group. This property, comprising a group of six claims, is situated on the Great Northern Railway at a distance of 3½ miles south of Nelson. It was staked in 1910 and developed by the owners until 1917, when it was decided to close down until the necessary capital could be obtained for development at greater depth and for the installation of a suitable concentrator. Accordingly, this year they formed a company called the Perrier Gold Mines, Limited, to which the title to the property has been transferred in exchange for stock. The capital of the company is $250,000 and stock is now being offered. The directors are all well known locally, the officers being C. E. Crossley, president, R. W. Hinton, vice-president; and W. M. Cunliffe, secretary-treasurer.

The general geological conditions are similar to those encountered in the vicinity of other gold gold-quartz veins which have been developed in the area to the south and west of Nelson. The *Perrier* vein cuts the schists of the Rossland volcanic group at an oblique angle and is a well-defined quartz-filled fissure with gouge on either wall, and has a strike of N. 10° E. and a dip of about 35° to the east or into the hill. It has been traced at intervals by small open-cuts through the overburden which covers the hillside for a considerable distance in a northerly direction from the present workings.

At a point between the railway and Cottonwood creek an incline shaft has been sunk on the vein for a distance of about 100 feet; for this distance the vein is persistent and has an average width of about 17 inches, with a tendency to widen near the bottom of the shaft. The values also show improvement with depth, according to samples taken. Unfortunately the last few feet of the shaft could not be examined on account of water.

The predominant values are in gold, of which about 70 per cent. is said to be free and the remainder associated with the sulphides. The associated minerals are iron pyrites, galena, and zinc-blende; the two latter, though not occurring in sufficient quantity to be considered a factor of economic importance, could be saved in the concentrates and are useful indicators as to the

gold-tenure of the ore, as the best values are generally found to be closely allied with them. This is true of most of the gold-quartz veins of the Nelson district.

At a point some 60 feet below the top of the shaft a small vein mineralized with galena and zinc-blende intersects the main vein. This is probably the same vein which has been drifted on from the surface at a point higher up the hill and at a distance of about 150 feet south-east of the shaft. It has a strike of N. 30° W. and a vertical dip conforming to those of the enclosing schists. The average width of this vein is about 7 inches. A sample taken in the drift showed the ore to be a fine-grained mixture of galena and zinc-blende containing the following values: Gold, trace; silver, 3 oz.; lead, 4 per cent.; zinc, 10 per cent.

From a point 50 feet below the collar of the shaft a drift was run for a distance of 129 feet in a northerly direction on the main vein. This encountered a faulted ground within a few feet of the shaft; the vein was picked up again in a short distance and a little ore was stoped, but not much importance can be attached to this level, which is driven near the surface, where the formation seems to be somewhat shattered and broken over. Extensive sampling of the vein in the shaft and drift gave an average value of $14.75 in gold and silver and an average width of 17.5 inches.

The following are results of a few samples taken across the vein on the south side of the shaft:—

At 20 feet from top of incline across a width of 12.5 inches: Gold, 0.38 oz.; silver, 0.4 oz.

At 30 feet from the top across a width of 14 inches: Gold, 0.40 oz.; silver, 0.4 oz.; lead, 1.5 per cent.; zinc, 0.4 per cent.

At 40 feet from the top across a width of 18 inches: Gold, 0.71 oz.; silver, 0.9 oz.

At 65 feet from the top across a width of 22 inches: Gold, 1.10 oz.; silver, 1.10 oz.; lead, 0.85 per cent.; zinc, 1.75 per cent.

No further sampling could be done at depth on account of water in the bottom of the shaft.

The ore taken from this shaft and the drift was treated in a small mill, and altogether values to the extent of about $3,500 are said to have been recovered. The loss in the tailings probably ran from 20 to 30 per cent. of the total values.

The mill, though limited to small capacity and incomplete in equipment, has served its purpose in helping to get returns on the ore mined and to demonstrate the amenability of the ore for amalgamation and concentration during the initial stages of development. To ensure the successful operation of the property on a more extensive scale it will be necessary to remodel the mill and possibly add a small cyanide plant.

It is understood that as soon as more capital is available the Company proposes to develop the vein at greater depth by sinking the shaft and establishing lower levels, and thus develop sufficient ore to justify a further expenditure on the mill. This would appear to be a good sound policy and fully justified by the existing conditions.

Briefly the present plant consists of: Small friction-clutch hoist; 8 by 10 Blake crusher; Challenge ore-feeder; Huntingdon mill, 3½ feet diameter; copper amalgamating-plate, 4 by 12; two Frue vanners; Rand compressor, 3-drill, or 350 cubic feet capacity.

The water-power to operate this plant is supplied by 2,000 feet of 8-inch pipe from Gold creek under a head of 440 feet. The power plant consists of one 24-inch Tuthill wheel. The mine is unwatered by means of a hydraulic ejector.

Eureka.—After advancing the long crosscut for a distance of 1,200 feet from the portal, the Vincent Development Company dropped their option on this property in the spring.

Aspen.—Situated on Deer creek, near Salmo. P. F. Horton has been busily engaged at the property. A small shipment of a high-grade ore was made to Trail.

Spokane Group.—Situated on Canyon creek, in the Bayonne district, Laib Bros., the owners, who have been doing development-work for some years, spent the latter part of the season in slashing a trail down Canyon creek to Kootenay lake. The property has suffered from lack of transportation facilities, and this in their opinion is the best route over which to take ore.

Among other properties at which there has been some activity are the following:—

Gold Hill.—Situated on 49 creek. Worked under lease by George Gormley. Over a car-load of high-grade gold-copper ore has been extracted ready for shipment.

Arnold Group.—Situated on the North fork of Salmon river. Worked by W. Connolly, the owner.

Mayblossom Group.—Situated near Ymir. J. F. Harbottle, the owner, has been employing seven men and expects to ship ore this winer.

Monarch Group.—Situated near Hall. Further prospecting and development has been done by J. Fisher, the owner.

Reno Group.—Situated on Fawn creek. W. B. Pool, the owner, put in a season's work at the property.

Ore Hill.—It is understood that a couple of men are being employed driving a crosscut, under contract, to tap the vein at greater depth.

Second Relief.—Situated near Erie. Two car-loads of concentrates were shipped to Trail. These came from the mill which was burnt last year.

A little prospecting was done on several groups of claims up the North fork of Salmon river. It is also reported that further work was done on the *Southern Belle* on Wilson creek.

Birdseye Group.* This group of eight Crown-granted claims—the *Birdseye*, *Lady Aberdeen*, *Minto*, *Haddo*, *Inverness*, *Lily Fraction*, *Princeton*, and *Ash*—is situated at an altitude of about 6,000 feet on Morning mountain, about 5 miles south-westerly from Nelson in a direct line. By wagon-road and by trail the distance from Nelson is nearly 8 miles. The present owners are an English syndicate, represented by H. J. Wilson, of Nelson, which acquired the property from the Nelson Copper Fields Company.

Free gold occurs in parallel elongated lenses of quartz in the schist-belt of the Rossland volcanic group. The strike and dip of the ore-bodies approximately conform to that of the enclosing schists. The quartz in places is stained and pitted from the leaching-out of the iron pyrites. Development-work amounting to about 300 feet of underground workings, in addition to numerous trenches and open-cuts on the surface, was mostly done about twenty years ago. A little work is said to have been done in 1915.

Most of the underground work was done on an outcropping lens of quartz on the *Birdseye* claim, having a width of from 15 to 20 feet on the surface. Here a 50-foot tunnel was driven into the quartz, and from near the extremity of this tunnel a winze was sunk about 75 feet from which short drifts were made. The quartz pinches out at the bottom of the winze. Seventy-five feet vertically below the upper tunnel a crosscut has been driven 80 feet in, but without exposing any ore.

On the *Lady Aberdeen* claim an open-cut has been made in another outcropping lens of quartz which has a width of approximately 20 feet on the surface. Values are said to have averaged about $40 in gold to the ton. Two grab samples from the dumps at the *Birdseye* and *Aberdeen* workings gave: Gold, a trace and 0.14 oz. respectively. The irregular nature of the deposits, however, makes accurate sampling very difficult and the highest values are probably confined to narrow pay-streaks and small shoots.

Noonday Group.* This group consists of four claims—*Noonday*, *Burnett*, *Marguerite*, and *Pearl Fraction*—owned by J. Radcliffe and J. S. Johnson, of Nelson, and bonded by O. W. Talley and associates, of Seattle, Wash., who were working the property this summer. The *Noonday* workings are situated at an altitude of 7,000 feet at the head of Sitkum creek, about 10 miles by trail from Kootenay lake.

A quartz vein occurs in the Nelson granite formation. The ore is partly free-milling gold quartz and partly concentrating-ore consisting of galena and iron pyrites carrying values in gold and silver. The ore is being mined from an open-cut and a drift 20 feet is on the vein, which is about 18 inches wide in the face. Gold is also panned from oxidized material from the outcrop of the vein. A sample of the pannings of this material gave: Gold, 1.92 oz. A sample across 18 inches in the drift gave: Gold, 0.84 oz.; silver, 0.6 oz.

Three men were employed at the mine at the time of the writer's visit in August. Ore was being packed on burros from the workings to the mill, a distance of approximately a quarter of a mile. The equipment consists of a Gibson prospector's mill, a No. 2 Denver rock-crusher, and an Ogden concentrator.

ARROW LAKES MINING DIVISION.

Millie Mack. Situated near Burton. A new adit-tunnel was driven and about 12 tons of ore extracted. The ore runs high in silver and often carries good gold value. The light tramway by which the ore is taken from the mine to the

trail some distance down the steep mountain-side has proved very satisfactory. H. E. Forster spent the the best part of the season at the mine. Two or three men were employed.

Chieftain Group. Situated on Caribou creek at a distance of 13 miles from Burton and almost opposite the *Millie Mack* mine. The distance is covered by road for 6 miles and then by trail. The group consists of the following claims: *Silver Tip, Mammoth No. 2, Chieftain, Dundas,* and *Duchess.* W. G. Clarke, of Sandon, is the principal owner. The hillside in the vicinity of the workings is covered with underbrush and a network of fallen timber, which rendered an examination of the surface showings impossible. The old cabins are dilapidated, though the underground workings are in good condition.

The geology of the district surrounding this section of Caribou creek is complicated and the structural features of the formation are difficult to follow. The upper portion of the ridge forming the south side of the creek is composed of Valhalla granite, which is a medium-grained light-coloured quartzose rock. From this batholith dykes and stocks have invaded the crystalline and highly metamorphosed rocks of the Shuswap series, which form the lower slopes of the mountain. On the northerly side of the creek remnants of the Slocan series form the upper portions of Grey Wolf mountain, on which the *Millie Mack* mine is situated. This formation has also been intruded by rocks of igneous origin.

It was in the early nineties when prospectors first found their way up this creek and staked a number of claims, among which was the *Chieftain.*

The vein is a quartz-filled fissure cutting the formation and having a dip of about 29° to the south-west. It strikes in an easterly and westerly direction obliquely across the hillside, which latter has a slope of 35°.

The workings consist of two adit-tunnels situated at an elevation of 4,300 feet above sea-level, or about 600 feet above the creek. The upper tunnel has been driven along the vein for 105 feet, at which point a 50-foot winze has been sunk. This is now full of water. In this tunnel the vein shows a width of from 3 to 5 feet and consists of shattered and crushed quartz, from which the metallic sulphides have been largely leached and oxidized by surface waters. Some high gold values are said to have been extracted from this level. A sample across a width of 3 feet of the vein at a point opposite the winze assayed as follows: Gold, 0.02 oz.; silver, 3.8 oz. While a sample from a small pile of sorted ore from this tunnel gave the following returns: Gold, 1.32 oz.; silver, 8.6 oz.

The vertical distance from the top of the winze to the surface is about 70 feet. The lower tunnel gains an additional vertical depth of 40 feet on the vein. The vein was struck at a distance of 152 feet, at which point 69 feet of drifting has been done. The formation encountered in the crosscut is composed of quartzites and highly metamorphosed slates. On this level the vein does not show such strength as it does in the upper tunnel and is not so well defined. The writer is of the impression that it may be an offshoot of the main vein; hence crosscutting and more drifting might be done with impunity.

A sample taken at 3 feet from the east face across a width of 13 inches ran: Gold, 0.24 oz.; silver, 5 oz.; zinc, 1 per cent.

At a distance of 11 feet from the face and across a width of 14 inches a sample ran: Gold, trace; silver, 296 oz.; lead, 0.5 per cent.; zinc, 2 per cent.

The ore is a "dry ore," the principal values being in silver and gold, the former being associated with grey-copper and a little argentiferous galena and the latter with the iron sulphides.

The property is easily accessible and conveniently situated both for water-power and timber. The present transportation facilities are not all that could be desired, as the trail is poorly located and has many adverse grades. Should the property be reopened and conditions be found to warrant the expense, about 4 miles of new road would connect the mine-workings with the existing one to Burton.

It is reported that J. Prow and J. Rymer cut out the trail to the *Canadensis* group, situated about 3 miles farther up the creek from the *Chieftain,* and put in a season's work on the property.

J. Reveler and J. Rymer did further work on the *Tillicum* group.

Promestora. Starting from the site of Mineral City, which at one time was the scene of quite a little mining excitement, a trail is followed up Mineral creek and the property is reached within a distance of about 4 miles. At an elevation of 4,300 feet and at the side of a small ravine an old tunnel and surface diggings immediately above its portal are all that remain to indicate previous efforts of development undertaken many years

ago. The surface is well covered with soil, supporting a thick growth of underbrush. There is evidence in places of trenching, but all such work has become filled in and grown over; hence tracing the vein on the surface was not possible.

In the face of a deep open-cut there is exposed a section of a quartz vein having a width of 5 feet and a vertical dip. It is heavily mineralized with iron suphides, which have become oxidized near the surface. From this open-cut some 10 or 15 tons of iron-stained quartz and a little pyrrhotite has been extracted and is now lying on the dump. A grab sample of this material ran: Gold, 0.30 oz.; silver, 0.40 oz.

The tunnel, which has been driven in a westerly direction at a vertical distance of 30 feet below the outcrop, has a length of 250 feet. It follows a soft streak of crushed material occupying a fault-fissure between walls of altered slates. For the first 40 feet this band of soft material carries a good deal of crushed and broken quartz; past this there is very little evidence of vein-matter.

The tunnel lies to the south of the outcrop, and a short crosscut from a point 70 feet in from the portal would prove whether the surface quartz is continuous with depth. It is authoritatively reported in the Minister of Mines' Report of 1896 that a 9-ton shipment yielded $60 a ton in gold. In this report it is also stated that the vein can be traced for between 1,000 and 2,000 feet.

TRAIL CREEK MINING DIVISION.

ROSSLAND CAMP.

Shipments from the Consolidated Mining and Smelting Company's mines were greatly curtailed and operations were principally confined to development and permanent improvements; of the latter, the concreting of the *Centre Star* shaft was probably among the most important. No ore was shipped from March 1st to July 15th, as the copper-furnaces at Trail were not in operation during that period. The total shipments for the year were about 50,000 tons.

Le Roi No. 2.—This mine has been operated steadily during the year and about 15,000 tons shipped to Trail.

Velvet.—Worked under lease by E. Nordman and associates. About 300 tons shipped to Trail.

White Bear.—In April the surface plant of this mine was destroyed by fire, with the exception of the transformer-house.

The smelting operations of the Consolidated Mining and Smelting Company of Canada at their large plant at Trail were productive of an output of gold, silver, copper, lead, and zinc, estimated at a total value of over $8,000,000. In view of the curtailed production of the Rossland mines, due to the low price of copper and the high cost of labour and supplies and the general curtailment of the silver-lead production, more especially that of the Slocan, due to the strike called by the O.B.U., the value of the production is remarkable and reflects credit on the management. Only during 1917 and 1918, a time when production was stimulated by the Great War, has the output surpassed that of this year.

During this year of depression in general mining activities the great *Sullivan* mine at Kimberley has been the mainstay of the metalliferous industry of this district, and by careful management of this property the company were able to draw sufficient ore to keep the big plant in operation and at the same time maintain the value of its yearly production.

It is interesting to note that over one-third of the total value of metals produced is represented by the production of zinc. This has been made possible by greatly improved mining and metallurgical treatment of the *Sullivan* ores, which has enabled a larger tonnage to be treated at greatly reduced costs, as compared with those in evidence during the early history of the huge electrolytic zinc-refinery.

During 1920 experiments were being made on a large scale, both by magnetic separation and oil-flotation processes. The former process at one time gave promise of being a very important factor in making a clean zinc concentrate, but improvements in the flotation process have now eliminated the magnetic machines from the flow-sheet. The present plant, which is equipped with Minerals Separation machines, has a capacity of about 900 tons. Briefly, the method is that of selective flotation. The lead is taken off first and then the zinc. The zinc concentrates are passed over a battery of tables, where a large percentage of the remaining lead is removed and the clean zinc concentrates are fed to the Wedge roasters of the electrolytic plant.

A 50-ton copper-rod mill is now nearing completion. A new and interesting feature of the plant is a large concrete ore-thawing shed having a capacity of fourteen cars. Owing to the drop in metal prices the company suspended nearly all construction-work at the end of the year.

Mountain Chief.—Situated at Renata, on the Arrow lakes. The property is temporarily closed down. It is understood that the company is endeavouring to interest more capital in order to carry out its plans of development and exploratory work.

Lord Roberts Group.

This group, comprising three claims—*Lord Roberts*, *Sir Douglas Haig*, and *Baden Powell*—is owned by Malcolm McIver and S. Forteath, of Rossland. The property is situated on the rounded summit of the divide between Murphy and Sullivan creeks at an altitude of 5,350 feet, or 4,000 feet above the railway. The distance by trail from Rossland is 9 miles, and about 4 miles in a direct line from Birch-bank, on the Canadian Pacific Railway. The natural outlet to the property would be to the latter place by way of Sullivan creek.

A number of open-cuts and several shallow shafts have exposed a body of magnetite, which varies in grade and apparently follows the somewhat irregularly defined contact between the Trail granodiorite and the rocks of the Rossland volcanic group. The presence of epidote, garnet, and hornblende would indicate that the ore-deposition is due to contact metamorphism.

The best grade of ore is a bluish massive magnetite and has a width, as exposed in several open-cuts, of from 4 to 8 feet. A sample of this ran: Iron, 54 per cent.; phosphorus, *nil;* sulphur, 2.69 per cent. Other phases of mineralization include higher percentages of pyrites, pyrrhotite, and traces of chalcopyrite.

A sample of magnetite in which a small percentage of iron sulphides was visible was taken from the bottom of a 20-foot shaft at the lower extremity of the property and assayed for copper, but gave negative results.

There is abundant evidence of mineralization over the small area exploited by the shallow surface workings, and a cursory examination gave the impression that there were possibilities of opening up a considerable tonnage of magnetite, but owing to the somewhat complex geological structure, a careful study of the deposit would be necessary to determine the best methods to employ for future development. As the ore is highly magnetic, a magnetic survey with a dip-needle should be of great help in tracing its occurrence.

NORTH-EAST KOOTENAY DISTRICT.

GOLDEN MINING DIVISION.

REPORT BY G. E. SANBORN, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on the Golden Mining Division of the North-east Kootenay District.

Only sufficient work was done in this district to keep the recorded claims alive, except on the *Monarch* claim, near Field. This property was operated and shipments made to Trail up to about December 1st, 1920, when market conditions for lead forced cessation of work.

OFFICE STATISTICS—GOLDEN MINING DIVISION.

Mineral claims recorded	34
Certificates of work issued	13
Free miners' certificates (ordinary)	107
Free miners' certificates (special)	2

Revenue.

Free miners' certificates	$ 504 00
General mining receipts	835 25
Tax on Crown-granted claims	532 50
Tax on mines and minerals	2,557 16
Total	$3,428 91

WINDERMERE MINING DIVISION.

REPORT BY E. M. SANDILANDS, MINING RECORDER.

I have the honour to submit my report for the Windermere Mining Division for the year ending December 31st, 1920.

Mining generally in this Division has improved a little and several new deals have been made. The sale of free miners' certificates and the location of claims have increased over the previous year. Towards the end of the year, however, owing to the low prices of both silver and lead and the refusal of the Trail smelter to pay for the lead content, some of the smaller properties were unable to operate and consequently had to close down temporarily. Should prices stiffen during the coming year there will be quite a bit of development done.

Paradise. This property is one of the old stand-bys of the district and has been worked continuously during the past year. Two thousand tons of silver-lead ore (sand carbonates) was shipped in 1920 and an average of about twenty-five men employed. A 5-ton White truck has been put on the road this year to haul the ore, and later on a trailer was added. The road on the south side of Spring creek has been widened and improved. Lead being the chief feature in this mine's ore, naturally this property has been hard hit on account of not being able to dispose of its lead.

Lead Queen. This property is situated on Frances creek and ships its ore to Brisco, on the Canadian Pacific Railway. This year no ore has been shipped. One hundred and twenty feet of crosscut tunnel has been driven, 34 feet of drifts, and 16 feet of raise. A building of 12 by 14 feet has been built, also a site graded out for the erection of a new cook-house, etc. I understand that there is a good showing of ore in both the drifts off the main crosscut tunnel. It is expected that next year the property will be worked more extensively.

Isaac. This property is also situated on Frances creek, a few miles below the *Lead Queen*. During the year some 75 tons of galena ore and carbonates has been shipped, averaging $84 a ton. Some 25 feet of tunnel, 8 feet of drifts, and 12 feet of shaft have been performed on the property. The ore is galena and carbonates and was shipped to the Trail smelter. The property, formerly owned by H. E. Forster, is under option to W. D. McMillan, of Seattle, Wash.

Nip and Tuck. This property consists of the *Nip and Tuck* and *Silver Tip* claims, which are situated on McDonald creek, a tributary of Horsethief creek. The owners are W. D. McMillan and V. Sontag, of Seattle, Wash. It has been under option and lease since last August. During the fall about 8 tons of ore has been hauled to Wilmer and 80 feet of tunnel has been run. The ore is good grade and will run to $150 a ton. It is silver-lead. At the time of writing the property is temporarily shut down, but further work will be done in the spring. Several cars of ore have been developed this fall.

Bunyan. This property is situated on the mountain at the back of Invermere and near Goldie creek. During the summer considerable work has been done on the claims and 65 tons of ore shipped, and 30 tons more is at the railway-track awaiting more favourable prices. A 1,000-foot tramway, 200-ton bunker, bunk-houses for twenty men, cook-house and dry-house, stable for 6 horses, blacksmith-shop, and powder-house have been built. A crosscut tunnel to tap the vein at 200 feet depth is being run, and should the ore warrant it a still lower one will be run to tap the vein at 600 feet. The values in the ore are silver, copper, and gold. The approximate value of the ore is $25 a ton. Large quantities are in sight and if prices warrant will be shipped later on. On an average about twelve men were employed during 1920. Four miles of new road has also been built.

Maple Leaf and Silver King. These claims are situated on Toby creek, at about the forks of Jumbo creek, and are under option to purchase from the owners, J. E. Stoddart and partners, to W. L. Smith, representing the Toby Creek Mining Company. During the summer considerable work was done on the claims, and especially on the surface, and a very large showing of both shipping and milling ore was uncovered. The grade of the shipping-ore is good. Owing, unfortunately, to impending litigation, work was discontinued in 1919, but I now understand this trouble has been settled. The claims have been surveyed this summer and Crown grants are being applied for. This property promises to be one of the largest in the district and quite extensive work will be carried on this coming summer.

Ptarmigan. This group of claims is situated at the head of Horsethief creek and was leased to E. Watson and others. During the fall of 1919 and the early part of 1920 quite an amount of ore was shipped from the dumps and brought a fairly good price. In the neighbourhood of 300 tons of ore was shipped to the Trail smelter. At the present time the property is shut down.

Bald Eagle. This group of claims is situated on the divide between Slade creek and Spring creek. Mr. Burman, with others, is the owner and continuous work had been carried on, but on account of lack of capital only about two men were employed on an average. There is a fine showing of good-grade galena ore and a shipment is expected this winter. The property is looking very good.

Office Statistics—Windermere Division.

Free miners' certificates sold (ordinary)	103
Free miners' certificates sold (special)	1
Claims recorded (quartz)	108
Certificates of work recorded	75
Certificates of improvements	1
Bills of sale, agreements, etc.	31

SOUTH-EAST KOOTENAY DISTRICT.

FORT STEELE MINING DIVISION.

REPORT BY N. A. WALLINGER, GOLD COMMISSIONER.

I have the honour to submit a report on the progress of mining in the Fort Steele Mining Division for the year 1920.

The season of 1920 has not added any names to the list of shipping mines, but, on the other hand, a much wider interest has been evinced in the properties of the district; many examinations have been made, and in most, if not all, cases where development is proceeding satisfactory improvements have been reported; in fact, the mining industry in the district is stronger than it has been for years, and it is expected, now that the presidential election is over in the United States, a stable money market will result in steady development as a corollary of the many examinations made this year.

Placer-mining has been fairly active throughout the district, although only one company reports a satisfactory clean-up, the others being still in the development state.

The Seattle company on Wildhorse has reorganized, and the Gamble Company, after a short successful run, had to shut down for repairs, the pipe-line having broken down. On Perry creek the hydraulic plant is completed and a little preliminary test yielded a nice return of fine gold. Other placers on Moyie and Bull rivers and Wildhorse and Weaver creeks are being put in shape for next season.

The progress of quartz-mining is satisfactory; the development of the *Victor* group is being rapidly pushed, new machinery being installed, a 50-ton concentrator erected, ore-bins and other necessary buildings built, and this winter's work should put the property on the shipping-list. The work on the *Rob Roy* group on Skookumchuck is progressing favourably under bond to the Globe Mining Company; a compressor and pump have been installed and work is being pushed; some native copper was found in the crevices of the ledge in the shaft and a fine grade of ore exposed. This vicinity has all been located and one company intends doing extensive diamond-drilling.

The St. Mary country did not come in for the attention that it thoroughly deserves; one or two examinations were made, but the results have not been made known. This section of the district has not as yet good transportation facilities, and this very strongly militates against its exploitation.

The hæmatite-deposits on Bull river and Sand creek were examined and well reported on. It is understood a deal is pending.

The free-milling gold-quartz camp on Perry creek came in for some examination, with indifferent results; apparently this type of ore needs special engineers, as many complaints have been made as to the method of sampling followed by the engineers. One report was very satisfactory, and in consequence a deal is pending whereby a prospecting-mill is to be installed.

The Tracy Creek camp came in for some attention, the *Estella* group being examined and favourably reported on; this property has a wide ledge of lead-zinc, as well as one or two leads of copper-gold ore.

The *North Star* mine has shipped approximately 6,500 tons of silver-lead-zinc ore and has had a very successful year.

The *St. Eugene* at Moyie has sent several hundred tons of galena to the smelter; the discovery of 3 feet of solid galena in this property shows that it is not all worked out yet. The shipments amounted to 650 tons of lead ore and over 250 tons of zinc ore.

The *Society Girl* at Moyie shipped a small car of ore to the Trail smelter; this property is under lease.

The returns from the *Sullivan* mine, the property of the Consolidated Mining and Smelting Company of Canada, Limited, show a marked increase over last year's shipments. Shipments for 1920 were as follows: Zinc ore, 242,229 tons; lead ore, 13,214 tons; iron pyrites, 4,300 tons; which are considerably higher than the total amount of ore shipped during 1919. Considerable improvements have been made, including the erection of twelve workmen's houses, two staff

residences, two bunk-houses, a machine-shop, and warehouse. Underground development was pushed actively; the lower tunnel, now in over 8,000 feet, was extended and an upraise connecting upper and lower workings completed. Among the future developments under advisement is the feasibility of bringing electric power for the mine from Bonnington falls, and when decided the construction of the concentrator will be undertaken.

Office Statistics—Fort Steele Mining Division.

Mineral claims recorded	155
Certificate of work (Form E)	273
Certificates of improvement (Form G)	37
Bills of sale, etc.	39
Gold Commissioner's permits	5
Documents filed	5
Affidavits filed	258
Mining leases issued	3
Free miners' certificates (ordinary)	310
Free miners' certificates (company)	3
Crown grants issued	3

Revenue.

Free miners' certificates	$1,595 25
Mining receipts	4,831 50
Total	$6,426 75

NORTH-WEST KOOTENAY DISTRICT.

REVELSTOKE AND LARDEAU MINING DIVISIONS.

REPORT BY ARTHUR JOHNSON, GOLD COMMISSIONER.

I have the honour to submit herewith a report on the mining conditions within the Revelstoke and Lardeau Mining Divisions for the year ending December 31st, 1920.

REVELSTOKE MINING DIVISION.

BIG BEND DISTRICT.

This important district was exceptionally quiet during the past year. The only work accomplished was by prospectors, who were content with doing assessment-work on their claims to keep them in good standing.

Two parties of returned soldiers under the direction and by the assistance of the Mines Department of the Government spent two months in the Bend prospecting; one party prospecting in the neighbourhood of French and McCullough creeks, the other party confining their prospecting up Downie creek and at the headwaters of Carnes creek. These parties located and recorded seven mining claims.

Placer-mining in the Big Bend during 1920 was at its lowest for many years, although a good deal of prospecting was undertaken by a number of placer-miners with a view to future operations, results of which it is expected will be seen during the forthcoming season.

ILLECILLEWAET CAMP.

A crew of eighteen men was employed on the old *Lanark* mines under the direction of the manager, W. B. Dornberg, and 60 tons of silver-lead concentrates was shipped to Trail smelter. This ore was extracted during the operation of carrying on definite development of the mine.

R. E. Taylor, of Nelson, took a bond during the summer on the *Crystal* group from Joe McKinnon and associates. The *Crystal* joins the *Lanark* to the north-west and some development-work was done on the lead with good results.

The *Silver Creek* mines on Silver creek were practically closed down during most of the season, and there is nothing to report as to conditions in this camp.

During the summer a few men were employed at the old *Waverley-Tangier* mines, situated about 30 miles north from the main line of the Canadian Pacific Railway at Albert Canyon. G. H. Walters, of Spokane, Wash., who acquired the property two years ago from Thomas Graham and Ole Sandberg, made an effort in the spring to find an outlet for this mine by way of Downie creek and the Columbia river to Revelstoke instead of by way of Albert Canyon. Three men were thus engaged for nearly two months, and their report is that the new route will be of great help to the operations of this property, as a splendid trail on an easy grade from the mine to the Columbia river is possible with the minimum of expense. The *Waverley-Tangier* will likely be in full mining operation during 1921.

OFFICE STATISTICS—REVELSTOKE MINING DIVISION.

(John Lee, Mining Recorder.)

Free miners' certificates	114
Free miners' certificates (company)	3
Certificates of work	55
Locations	53
Bills of sale recorded	3
Transfers recorded	1
Memorandum of agreement	9
Payments in lieu of work	2
Groupings recorded	7
Placer leases recorded	2

LARDEAU MINING DIVISION.

With the exception of the mining operations on the old *Beatrice* mine, where four men under the management of H. E. Bodine, of the New Era Mines, Limited, of Vancouver, were employed during the summer in clearing up the old workings and in developing new ore-bodies, there is nothing to report from this camp.

At the *Berniere* group cabins were constructed with the view to extensive development-work during the season.

The outlook for 1921, however, is more promising than for 1920, as a good deal of interest has been inspired in the camp since the visit of M. F. Bancroft and party, of the Geological Survey of Canada, who spent considerable time in this Division during the early fall.

Office Statistics—Lardeau Mining Division.

(Ernest Roberts, Mining Recorder.)

Free miners' certificates	32
Free miners' certificates (company)	1
Locations recorded	28
Bills of sale recorded	5
Certificates of work recorded	66
Payments in lieu of work	4
Groupings recorded	10

SLOCAN DISTRICT.

AINSWORTH MINING DIVISION.

REPORT BY RONALD HEWAT, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on mining operations in the Ainsworth Mining Division for the year ending December 31st, 1920:—

The mining operations during the year were greatly retarded, first, through the lack of labour in the early part of the year; and, secondly, the discontent which developed later among the miners, finally resulting in a strike called by the One Big Union. This tied up the mining industry, as the operators refused their demands, with one exception—viz., the Silversmith Mines, Limited, operating the old *Slocan Star*, and for months only that property was active. Through the lumber industry falling off there have been plenty of men lately and work on several of the well known properties has been resumed, but the damage as far as the year's production is concerned was done.

Silver Bear. A prospecting-tunnel was driven farther into the vein and drifting was done for another 180 feet and raises put in connecting with the surface. This work was done in order to prospect and prove up the vein. Seventy-seven tons of high-grade ore was shipped in the course of carrying out this work. Certain work has been done on surface for the purpose of proving up the extension of the ore-shoots. Additions have been made to the bunk-house and cook-house for further accommodation of more hands. The compressor building has been built and machinery installed. A lower tunnel-site has been located with the object of striking the vein at a depth of 150 feet, from which drifts will be driven. All this work is held up, I have been informed, by the refusal of the Trail smelter to pay for the ores in the ordinary way at time of sampling.

Silver Bell.—Work on the *Silver Bell*, situated on the South fork of Kaslo creek, consisted of 523 feet of drifting, 42 feet of crosscutting, 170 feet of raising, and 52 feet of sinking; an average of eight men was employed and ore shipped amounted to 220 tons.

Whitewater.—Located at Retallack. Mostly worked under lease, although the company had a small crew at work taking out ore. Average total employed during the year about eighteen men; shipped 600 tons of silver-lead ore and 164 tons of silver-zinc ore. The company lost its main bunk-house and dining-room by fire in August, and it is intended to replace these during the coming year.

Washington.—A lease was let in May to three Italian miners, who took out 36.61 tons of silver-lead ore, which was shipped to Trail. Leasers quit when winter came on. Nothing done on company's account.

Cork-Province.—This mine has remained idle all the year on account of the strike called by the One Big Union and high operating costs of the year.

Highland.—Operated by the Consolidated Mining and Smelting Company of Canada, Limited. Work consisted of 117 feet of drifting and 27 feet of raising; 830 tons of ore mined and 189 tons shipped, containing 847 oz. silver and 55,375 lb. lead. Thirty-four men were employed. Mine closed down on February 14th, 1920.

The *No. 1*, operated by the above company, employed an average of eight men and shipped 694 tons, containing 21,746 oz. silver and 12,468 lb. lead. Development-work consisted of 110 feet of drifting, 191 feet of raising, and 14 feet of winze. Mine closed down on October 31st.

The *Panama*, owned by H. Giegerich, near Bear lake, did development-work consisting of 150 feet of tunnel and 300 feet of retimbering.

The *Maestro*, situated in the Ainsworth camp, owned by H. Giegerich, and which was leased for the greater part of the year did a small amount of development-work and shipped a small car of ore.

The *Skyline*, situated at Ainsworth and owned by A. W. McCune, of New York City, did development-work consisting of 300 feet of drifts and upraises and shipped 138 tons of ore.

The *Utica*, owned by the Utica Mines, Limited, shipped 708 tons of ore during the year, containing 75,864 oz. silver and 167,708 lb. lead.

Florence. This property, owned by the Florence Silver Mining Company, Limited, employed on an average about fifty-five men, and shows a production for the year of approximately 16,900 tons gross; concentrates shipped, 1,173.2 tons; dry ore shipped, 132.5 tons, containing 18,695 oz. silver and 1,518,083 lb. lead, at an estimated value of $95,000. The operations of the company were handicapped by a three-months enforced shut-down the first part of the year, due to power shortage resulting from the unusually dry and cold weather, and the mines were shut down on December 1st owing to metal market declines and unsatisfactory smelter arrangements, which continued through to the end of the year.

Bluebell. Operations at this mine began during April and continued until the end of the year, and during that period there was mined and treated 13,223 tons of ore. About 2,200 tons of crude oxidized ore was shipped to the smelter without milling, and the balance was concentrated mechanically. All the ore was of an oxidized nature and came from the surface to the east of old glory-hole workings.

Office Statistics—Ainsworth Mining Division.

Free miners' certificates	161
Mineral claims recorded	118
Certificates of work (Form E)	278
Bills of sale, agreements, etc.	75
Mineral claim leases	24
Certificates of improvement	6

SLOCAN MINING DIVISION.

Report by Angus McInnes, Mining Recorder.

I have the honour to submit herewith my annual report on the Slocan Mining Division for the year ending December 31st, 1920.

I regret to say that owing to a strike which started early in the year, brought on by the organization known as the O.B.U., there has not been much progress nor development of any kind done; and now that the strike is broken up the slump in the price of metals has caused the mine-owners to seriously consider the situation before starting again on a big scale.

The *Noble Five* at Sandon and the *Bosun* at New Denver are the only two that are now operating to any extent.

The *Silversmith* was operated all year.

The big concentrator at the *Noble Five* has been finished and is now in operation. About seventy-five men are employed in the mill and the mine.

The *Bosun* is working about forty men, doing mostly development-work. Their mill at Rosebery has been closed down for the winter months.

The *McAllister* is working a few men on development-work and will begin the building of a mill in the spring.

The *Rambler* has closed down for the winter.

Office Statistics—Slocan Mining Division.

Free miners' certificates	177
Free miners' certificates (company)	4
Claims recorded	40
Assessments recorded	82
Revenue collected	$5,998.25

SLOCAN CITY MINING DIVISION.

REPORT BY T. McNEISH, MINING RECORDER.

I have the honour to submit my report of mining conditions in the Slocan City Mining Division for the year 1920.

Owing to the strike in the Slocan the mines have been nearly all tied up, and no capital has been coming in, so the work done has been very small outside of the usual assessment-work required to keep the claims in good standing. What few properties have been working have given very encouraging results. I beg to submit herewith a memorandum of the principal properties which were in operation.

The *Anna* mine, owned by Kurt Zimmerman, which was under lease and bond to Earl Hyde, shipped 58 tons of very high-grade ore and has a fine showing at present.

The *Little Tim*, owned by D. B. O'Neail and A. S. McAuley, has been doing development-work and has shipped 5 tons of ore, but considerable difficulties have had to be overcome. They now have a fine pay-streak and believe that in the coming year, with the settlement of the labour difficulties, this mine will be a good shipper.

The *Ottawa* mine, under lease and bond to A. L. McPhee and L. H. Biggar, shipped 467 tons of ore during the year. For the last four months the lessees have been engaged in constructing a 75-ton tube-mill, with which they intend to concentrate the dumps, and they also have considerable mill-feed in the mine, but the heavy snows have caused them to cease operations; but a short while in the spring will have this in operation. It is being watched with interest by mining men in this district, as at the present it is in the nature of an experiment, and if successful will possibly mean a big thing for the Slocan, as there are several mines that could be worked at a profit if possible to work them with a mill of this kind on the ground.

The *Republic*, which was under lease and bond to A. W. Evans, of Nelson, shipped 19 tons of very good ore, but has ceased operations. There is a very good showing on the property at present, and it is believed that in the spring it will be operated again.

The *Black Prince*, under bond to J. T. Tipping, has been doing extensive development-work and has not shipped any ore during the year; but two cars are now ready for shipment, and it is expected that in the spring extensive shipments will be made from this mine.

The *Two Friends*, owned by C. E. Cartwright and others, has been considerably developed. A good shoot of high-grade ore has been struck, but the mine had to be closed down on account of the deep snow. The mine will be reopened in the spring.

The above is practically all the work that has been done in the camp during 1920, but I think that during the coming year, with the settlement of the strike and the stabilizing of the silver markets, considerable work will be done on the claims here.

OFFICE STATISTICS—SLOCAN CITY MINING DIVISION.

Free miners' certificates issued	72
Certificates of work recorded	105
Locations recorded	27
Transfers recorded	4
Notices to group	12
Poll-tax receipts issued	18
Firearms licences issued	43
Marriage licences issued	7
Total receipts of office	$1,032.90

TROUT LAKE MINING DIVISION.

Report by Oscar Jacobson, Mining Recorder.

I have the honour to submit herewith my report for the Trout Lake Mining Division for the year ending December 31st, 1920.

No development worth speaking of has been made during the year, but from information received it is possible that some new development will be in progress during the coming season.

The owners of the different and most promising mineral claims in the district have kept up their assessment-work during the year.

Locations of new claims show a substantial increase over 1919.

Office Statistics—Trout Lake Mining Division.

Free miners' certificates issued (ordinary)	53
Free miners' certificates issued (company)	1
Locations recorded	47
Certificates of work recorded	118
Notices to group filed	31
Transfers recorded	5

NELSON DISTRICT.

NELSON MINING DIVISION.

REPORT BY J. CARTMEL, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on the Nelson Mining Division for the year ending December 31st, 1920.

Whilst the tonnage mined did not equal that of the previous year, yet the amount of development accomplished was probably greater. In spite of this, however, it cannot be said that 1920 was a satisfactory year for the mining industry in this particular district, and at the close of the year mining was practically at a standstill.

The only redeeming feature would appear to be the fact that this state of affairs is due almost entirely to economic conditions prevailing at the present time, the high cost of labour, material, etc., making it impossible to operate at a profit. This applies particularly to those properties the principal values of which are in gold.

However, as the economic conditions would appear to be at last moving toward the pre-war normal, the coming season is looked forward to with a considerable degree of confidence, and from all accounts a number of the more important gold properties will be commencing operations again in a short time.

NELSON CAMP.

Eureka Group. The Vincent Development Company, which had this property under bond, drove a crosscut tunnel a distance of some 1,200 feet with the object of tapping a vein at greater depth, but apparently it became discouraged and withdrew, allowing its bond to lapse. The general impression appears to be that the company failed to do sufficient careful prospecting in connection with the development of this tunnel, and notwithstanding this set-back a number of mining men hold the opinion that this property has much merit, and with proper development will yet prove a remunerative investment for some one with sufficient capital to carry out a practical and systematic policy of development.

California. The *California*, *Athabasca*, and *Exchequer* groups, which are all under bond to J. R. Cassin and associates, of Spokane, Wash., have received considerable attention in so far as development is concerned. The old *Athabasca* mill was remodelled, there having been added a Hardinge conical ball-mill and a flotation plant. This was run for a short time last fall as a test, and then closed down owing to the present high cost of production and operation. There is said to be sufficient ore blocked out on the property to keep the mill running steadily for years, and with the additional tonnage which may be expected from the *Athabasca* and *Exchequer* it is safe to predict that once the cost of production becomes nearer to normal a vigorous policy of development will be carried out and these properties become among the very largest producers in the district.

Perrier. This mine, situated on Cottonwood creek, quite close to Nelson, has not, I think, received any material attention during the past year, but a local company has been organized with a view to financing the purchase of necessary machinery and the installation of a mill. With proper equipment the mine should become a profit-producer, judging from its showings.

Gold Hill. This property, which is situated on Forty-nine creek and is owned by Alex. McDonald and partners, has late in the fall shown up much larger ore-bodies than ever before encountered, and George Gormley has secured a lease on the mine and is conducting active operations thereon. A car of the ore shipped to the Trail smelter showed up well, yielding $55 a ton in gold, with also a fair percentage of copper, and arrangements have recently been made with the owners of the *Granite-Poorman* mill to treat a quantity of milling-ore, 45 tons of which is already being hauled there.

The *Birdseye* group, situated near Nelson, has received some attention during the year, but work is closed down at present. I believe, however, that its English owners intend to institute a more progressive policy of development in the spring.

Granite-Poorman. Two men, Watson & Wolverton, secured a lease on this property during the latter part of the year and carried out a small amount of development and research work, resulting in the production of a small gold brick, and I understand that recently a syndicate of mining men have become interested in the venture, who are in a position to supply the capital necessary to enable the carrying-out of further development-work with a view to testing the continuity of the worked-out ore-bodies with depth. Should their efforts prove successful, which it is sincerely hoped they will, we may expect to see this well-known property once again a producer.

Monarch Group. This group, which consists of six claims, is situated near Hall Siding, and is owned by Jas. Fisher and partners. Little more than the necessary assessment-work was done during the year. Most of the work done so far consists of open-cuts, in some of which good showings have been secured, the best of which exposes 27 feet of copper-gold ore averaging 1½ per cent. copper and $1.80 in gold. A 92-foot tunnel struck the lead at a depth of 50 feet.

The *Molly Gibson*, operated by the Consolidated Company, employed thirty-one men; 372 tons of ore mined and 272 tons shipped, containing 4,349 oz. silver and 1,501 lb. lead. Development-work consisted of 92 feet of drifting and 31 feet of raising. Mine closed down on February 14th.

OTHER CAMPS.

Emerald. This mine, which is situated on Sheep creek, shipped altogether some 873 tons. The new mill did not at first give expected results, but after receiving attention at the hand of an expert it is stated that results are now fully up to expectations. Owing to the early unsatisfactory working of the plant, shipments were necessarily somewhat curtailed, and, of course, the present low price of lead was also a contributing factor.

Nugget. Considerable development was done on this property following the striking of the vein by the 1,200-foot tunnel driven through the *Motherlode*, and a large body of ore was blocked out for stoping. A quantity of the ore was run through the *Motherlode* mill, but the high cost of production made a discontinuance of this advisable for the time being. Everything is in readiness, however, to commence operations again on the return of conditions more favourable to gold production.

Reno Group. On this group, which is situated on Fawn creek, considerable development was done during the year, and the owners, W. B. Pool and associates, have satisfied themselves that several of the veins go to depth. The ore is free milling and is said to carry excellent values.

Second Relief. Apart from the shipment of about 75 tons of concentrates to Trail, nothing was done on this property during the year, A. D. Westby, the manager, being engaged in an endeavour to raise capital necessary to rehabilitate the mine, which was put out of business by forest fires causing the complete destruction of the plant during the previous year. Mr. Westby informs me that his financial plans are maturing favourably and that he expects to have work under way in the spring.

Spokane Group. On this group, which is situated in the Bayonne camp, the Laib Bros. have not done any great amount of development this year, having devoted their energies to the construction of a trail to Kootenay lake, following Canyon creek, the problem of transportation being the most pressing one at the moment. It is stated that ore to the estimated value of some $100,000 has been blocked out on this property, which it is impossible to ship owing to the lack of a trail over which it could be transported.

Yankee Girl. This well-known mine, situated near Ymir, is owned by the Hobson Silver-Lead Company, but during the past year has been under option to the Mining Corporation of Canada, by whom a large amount of development-work was done, and I understand that while operations were suspended fairly early in the fall upon instructions from headquarters in the East, the original owners are quite satisfied that the property is in a position to renew production with the advent of the better economic conditions which it is earnestly hoped will soon be in evidence.

OFFICE STATISTICS—NELSON MINING DIVISION.

Free miners' certificates (individual)	411
Free miners' certificates (company)	8
Free miners' certificates (special)	1
Claims recorded (mineral)	167
Certificates of work recorded	390
Agreements, transfers, etc.	84

ARROW LAKE MINING DIVISION.

WALTER SCOTT, MINING RECORDER (OFFICE AT NAKUSP).

I have the honour to submit the annual report on the Arrow Lake Mining Division for the year ending December 31st, 1920:—

Millie Mack.—H. E. Forster has 12 tons of ore sacked, waiting sleigh transportation to the smelter.

Hoodo Group.—Prough & Rymer are driving a tunnel upon the *Hoodo* mineral claim this winter.

The *Tillicum* group of mineral claims, owned by Reveler & Robson, has had considerable development this summer and looks promising.

OFFICE STATISTICS—ARROW LAKE MINING DIVISION.

Free miners' certificates issued	46
Special free miners' certificates issued	2
Certificates of work recorded	19
Mineral claims recorded	11

ROSSLAND DISTRICT.

TRAIL CREEK MINING DIVISION.

Report by H. R. Townsend, Gold Commissioner.

The mining operations in this district have been very slight during the year. The Consolidated Mining and Smelting Company of Canada has continued with some development-work and has shipped a limited amount of ore, shipments being somewhat increased latterly.

The *Le Roi No. 2* shut down before the end of the year.

The *Velvet* mine is being worked by a syndicate of local men who have an option to purchase, and they express themselves as well satisfied with their prospects.

A placer lease was granted to Ruffner, Graham & Symons of 1 mile of the Columbia river northerly from the International Boundary, and they are operating during the low water, but I have not been informed as to the results obtained.

Office Statistics—Trail Creek Mining Division.

Free miners' certificates (individual)	124
Free miners' certificates (company)	2
Mineral claims located	28
Certificates of work recorded	60
Certificates of improvements	4
Bills of sale, agreements, etc.	14
Leases of reverted claims	30
Placer lease	1

SOUTHERN DISTRICT (No. 4).

REPORT BY PHILIP B. FREELAND, RESIDENT ENGINEER.

INTRODUCTORY.

The above district includes four Mining Divisions—Grand Forks, Greenwood, Osoyoos, and Similkameen. The mineral production of this district is considerably below its former average, chiefly owing to the closing-down of the Granby mines at Phoenix in June, 1919, which diminished the production of copper and gold, the chief output from the Phoenix mines.

The high price of silver during the first part of the year stimulated the mining of the silver-lead ores, resulting in a larger tonnage, as will be seen below:—

TOTAL TONNAGE AND CONTENTS IN MINING DIVISIONS FOR 1920.

Mining Division.	Ore.	Gold.	Silver.	Copper.	Lead.	Fluorspar.	Arsenic.
	Tons.	Oz.	Oz.	Lb.	Lb.	Tons.	
Grand Forks	41,473	1,019	15,387	571,878	5,278	7,477	.....
Greenwood	1,727	631	298,801	10,482	101,155	.....	.....
Osoyoos	40,925	18,716	71,493	.....	.....	.....	$22,231
Similkameen	18,907	69	3,326	462,047	.....	.....	.....

Practically all the silver and lead ores came from the immediate vicinity of Greenwood and Beaverdell.

It seemed probable that the output from the Canada Copper Corporation's mines on Copper mountain, near Princeton, would offset the loss of the Phoenix tonnage, but, owing to unforeseen difficulties, operations did not commence until late in the autumn, and about the same time the price of copper dropped to 13.5 cents a pound, making impossible profitable mining for the company in its early stages. The mine was closed down pending a rise in copper prices or a decreased cost in supplies and wages.

Satisfactory results were obtained in the mine, the ore breaking easily and in comparatively small pieces. It was found that the 42- by 36-inch Farrel-Bacon jaw-crusher in the primary crushing plant had very little work to do, whilst the No. 6 McCully gyratory crushers were overworked. In the mill the rolls did not crush the small siliceous pieces of rock satisfactorily, and it seems probable that some type of crusher giving a hard blow will have to be used.

The future possibilities in the district lie along the lines of close examination and research with the idea in mind of possible concentration. The good systems of railroads, wagon-roads, and high-power electric lines running through the district are an added attraction to capital and will solve the problem of transportation, so difficult to overcome in outlying districts.

It seems probable that most of the outcrops of self-fluxing copper ore-bodies have been discovered and mined. Other deposits, lower grade and more complex, have not been thoroughly exploited, and it is these varieties of ore that might command attention, as well as possible ore-bodies that do not outcrop.

In the neighbourhood of Deadwood, near Greenwood, there is some attractive surface mineralization; also an area between Beaverdell, on the Westkettle river, and the Kettle river, and in portions of the Granby (North fork of the Kettle) river; also the country lying south of Princeton in the vicinity of the Roche river and Whipsaw creek.

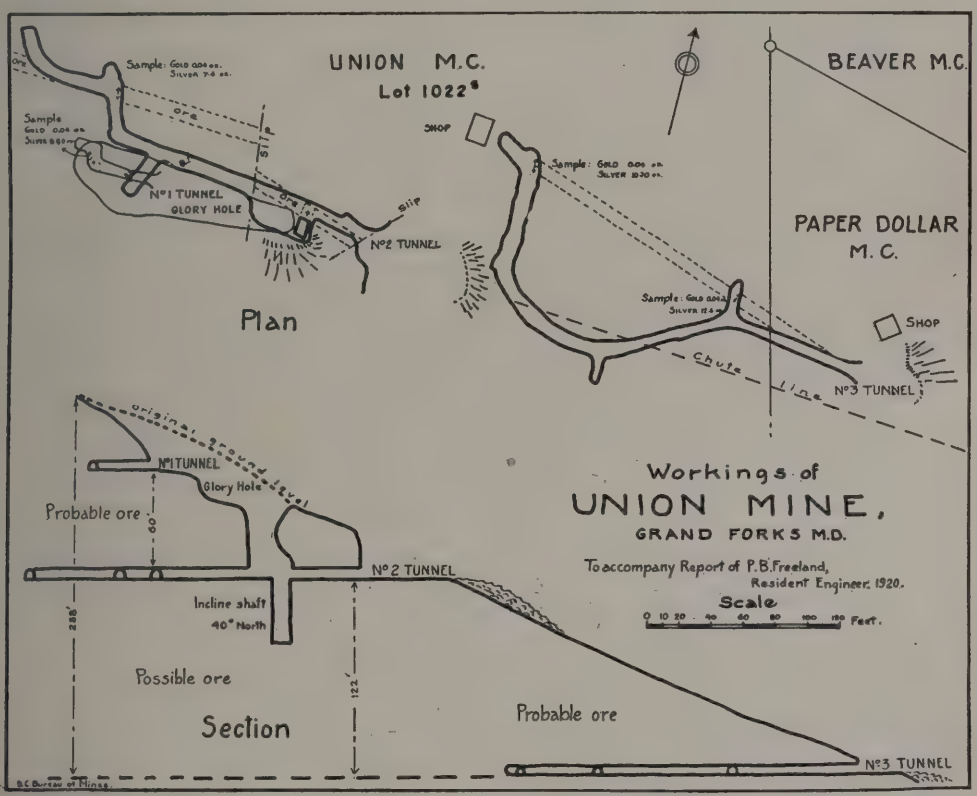
GRAND FORKS MINING DIVISION.

FRANKLIN CAMP.

Union.

The Union Mining and Milling Company, Limited, a stock company, was formed towards the end of the year with the idea of financing a development programme and, if sufficient ore is found to warrant it, the construction of a

concentration plant. The *Union* claim, which is one of a group of four—*Idaho*, *Paper Dollar*, *Union*, and *Union Fraction*—has been worked spasmodically for some years by the owners, who shipped several thousand tons of silver-gold ore from the upper workings. This ore assayed anywhere between $30 and $100 a ton and represented what was probably the bottom of a secondarily enriched zone. All development-work, as far as it has gone, below the second level showed leaner ore carrying values from 0.03 oz. in gold and 13.90 oz. in silver to 0.15 oz. in gold and 8.80 oz. in silver to the ton. With the possibility of price of silver declining to about 50 cents an ounce, it will be seen that a very close estimate of costs must be made before any outlay for plant could be considered.



The mine is well located for cheap operation, being close to the Granby river and on a hillside where tunnelling methods could be used to advantage. The hardness of the ore and adjacent rock will eliminate the necessity of timbering, which would reduce the cost of mining. The mineral contents of the ore, chiefly pyrite and silver sulphides in a gangue of silica, lend themselves particularly well to the oil-flotation treatment. A shipment of 28 tons of ore was sent to the Trail smelter early in the year.

A Memoir (No. 56) was written on the Franklin camp by the late Dr. C. W. Drysdale, of the Geological Survey of Canada, in which the geological conditions of the camp are dealt with in detail.

Maple Leaf.

This mine adjoins the *Union* group to the north and has been under development for some time by a stock company. Two car-loads of picked copper ore was shipped from the upper workings a few years ago, and it was discovered that the contents contained platinum up to 0.45 oz. to the ton, besides copper. This discovery did not create much interest at the time because there was not a very great demand for platinum, and unless there was a sufficient tonnage to supply one furnace at the smelter no payments for platinum would be received.

During the war the demand for platinum increased, and an examination of the *Maple Leaf* upper workings was made by the Munitions Board Commission of Ottawa, with the result that

platinum was found in conjunction with the copper ores, but that there did not appear to be sufficient tonnage blocked out or easily accessible to warrant further expenditure. It must be understood that platinum was needed by the Board at once, and the Board did not feel justified in spending the time to develop this property.

The surface excavations show copper sulphides in small segregations and in the fractures close to the contact of the pyroxenite and augite syenite. The pyroxenite rocks in this locality seem to be responsible for any platinum values that occur, and with the present price of platinum at about $85 an ounce it seems that if any development-work is done on the property it should be in the vicinity of the pyroxenite rocks, so that if a body of copper sulphides is uncovered the platinum values may be taken advantage of.

Most of the work has been done on the lower tunnel, where a freshet stripped the volcanic tuffs and showed native copper and carbonates in the fractures. A development-tunnel passed through this mineral zone and was continued in spite of the disappearance of the copper values. Probably the management hoped to strike the genesis of the native copper showing near the mouth of the tunnel. It seems probable that the copper in this case is of a secondary nature and its genesis should be looked for above. A contract for 100 feet of tunnel was let and completed during the year.

Gloucester and G.H.

The *Gloucester* and part of the *G.H.* claims, owned by Thos. Newby *et al.*, of Grand Forks, were diamond-drilled by the Provincial Government under the provision of the "Mineral Survey and Development Act." Drilling operations were commenced on the *Gloucester* claim on June 5th and finished on October 10th. A total of eight holes were drilled, aggregating 2,888 feet and varying in depth from 133 to 492 feet. The general type of the rock encountered was greenstone, cherty quartzite, and an altered tuff, which became intermingled with granodiorite on its contacts. All through this formation small veinlets were cut containing pyritohedrons of iron, with occasional segregations of hæmatite and specks of chalcopyrite.

On the *Gloucester* an old tunnel and shaft had developed a shoot of chalcopyrite about 4 feet wide and 25 feet long; drill-holes were bored under this showing with negative results. Other holes near the contact of the volcanic tuff and the augite syenite were drilled, also with negative results.

One hole was put down about 40 feet deep through the magnetite capping on the *G.H.* claim, which showed specks of chalcopyrite and a considerable amount of hæmatite and magnetite carrying small values in gold and silver. Another hole was started at a deeper angle under this outcrop, but was not finished owing to the contractor withdrawing his outfit.

North Fork of Kettle River.

Little Bertha.

Between 300 and 400 feet of crosscut tunnel has been driven on this claim under contract by Ab. Savage, of Grand Forks. No values have been developed up to the present time, other than a few mineralized stringers.

Rock Candy.

This property, owned by the Consolidated Mining and Smelting Company of Canada, was operated steadily throughout the year, except for an occasional shut-down on account of forest fires in the vicinity of the mine and a broken cable. Continuous development was carried on in the intermediate and lower tunnel (*see* map, 1919 report) on the strike of the deposit. The ore-body in the lower tunnel is split by small tongues of alkali syenite, which, though hampering the development-work, are being used for pillars to support the ground. The total drifting consisted of 427 feet and upraising 160 feet. The width of the deposit on the lower level averages about 25 feet and on the intermediate about 35 feet.

A new bunk-house was constructed at the mine and mill and a mill extension for a table addition consisting of two Wilfley and one Deister tables. A total of 22,673 tons of ore was mined and 19,730 tons of fluorite milled, giving 7,477 tons of concentrates. An average number of sixty-one men was employed at the mine and mill. The silica content constitutes one of the chief difficulties to be overcome, and the installation of the three tables was made with the idea of eliminating as much silica from the fines as possible. The concentrates from the tables are elevated and dumped into the hot product from No. 1 and No. 2 kilns, and thus most of the moisture is evaporated before screening.

Coltern.

Emma. This mine is situated near the summit of the wagon-road between Grand Forks and Greenwood and is owned by the Consolidated Mining and Smelting Company of Canada. Operations were carried on for six months of the year, and 18,070 tons of low-grade copper ore was shipped, chiefly as a flux, to the copper-smelter at Trail. Development-work consisted of 131 feet of drifting and 62 feet of upraises. An average of thirty men was employed.

Paulson.

Molly Gibson. The Molly Gibson Burnt Basin Mining Company, of Rossland, has developed this property in a small way during the year. The old shaft was sunk further and it is understood that a large ore-body was uncovered. Shipments amounted to 71 tons of ore carrying gold and a small amount of silver.

Lightning Peak.

Rampulo.—Development-work was advanced by the owner, A. Cortiana, on the lower tunnel and will be continued during the winter.

Equinox Group.—W. A. Calder shipped 6 tons of ore to Trail from the *Lightning Peak* claim of this group, carrying some silver and high values in lead.

Christina Lake.

Fife Lime-quarries.—These quarries are situated near Christina Lake and are owned by the Consolidated Mining and Smelting Company of Canada, which uses the material mined as a flux in the smelter at Trail. A total of 22,338 tons of lime-rock was shipped.

Grand Forks.

Yankee Boy.—This property was leased by W. Bailey *et al.*, of Eholt, and 10 tons of ore shipped to the smelter, carrying values in gold, silver, and lead.

Granby Smelter.—The Granby Consolidated Mining, Smelting, and Power Company's smelter is being dismantled at the present time. The total amount of matte and "clean-up" material sent to the Trail smelter was 594 tons, containing gold, silver, and copper.

GREENWOOD MINING DIVISION.

Wallace Mountain.

The owners and lessees of the silver-lead properties on Wallace mountain, Beaverdell, were materially assisted by the high prices of silver early in the year and a fair profit was made, although wages and supplies were high and the mining of the ore-bodies expensive on account of extreme shearing and faulting.

Bell. The owners, Dunc. McIntosh and Pat. Crane, in the early autumn installed a small compressor and oil-engine at the mine. A motor-truck was purchased to haul the ore to Beaverdell and to bring in supplies. Several hundred feet of tunnels and open-cuts was driven and 264 tons of silver, gold, and lead ore was shipped to the Trail smelter.

Sally and Rob Roy. This group is owned by the Wallace Mountain Mines, Ltd., of Penticton, and the property was worked during the greater part of the year. Practically all the development was done on the *Rob Roy* claim, which adjoins the *Sally* on the north, and consisted of 1,106 feet of drifting, 198 feet of crosscuts, 75 feet of upraising, and 26 feet of sinking. An average of eighteen men was employed and 355 tons of ore shipped to the smelter, carrying silver, lead, and some gold. Ed. Nordman is in charge of the work.

Wellington.—James Sutherland, *et al.*, of Greenwood, leased this claim and developed some fairly high-grade silver-lead ore. Shipments to Trail smelter amounted to 25 tons of silver-lead ore.

Rambler.—The owner shipped 13 tons of high-grade silver-lead ore to the smelter at Trail.

Highland Chief. About twenty years ago this property was prospected by tunnels and open-cuts in an endeavour to discover some high-grade ore. In the summer of 1920 Ed. Maloney, of Penticton, developed a small lead of silver-lead that carried

sufficient values to make the property attractive. A short tunnel was driven on this lead and about 4 inches of ore uncovered. It will be necessary to uncover more of this grade of ore before the mine can be placed on the shipping-list.

Castor Frac.—This property lies to the east of the *Bell* and *Sally* mines and was leased by Geo. Hambly, R. Perry, and R. D. McKenzie, of Greenwood, and 38 tons of high-grade silver-lead ore shipped to the Trail smelter.

Lightning Peak.

Part of this camp lies in Grand Forks Mining Division.

Waterloo. This mine is situated near Lightning peak, about 12 miles in a straight line west of Edgewood, on the Arrow lakes. The owners, G. A. Rendall, Geo. Bong, and Chas. Hammersley, of Greenwood, spent a short time in the early spring and late summer breaking and sacking ore from the intermediate tunnel. The weather conditions were so bad that only 22 tons of high-grade silver-lead ore was packed out on horses. This property is an attractive one and only its distance from transportation hinders it from being a regular producer.

Greenwood.

Providence. The three-year lease held by Al. Morrison and D. McGillis, of Greenwood, expired on November 14th and work on this property ceased. The owners, represented by C. Madden, of Chicago, are considering the possibility of operating the mine themselves. Development-work for the year amounted to 250 feet of tunnels and 135 feet of upraising and the installation of part of the surface plant. Shipments to the smelter amounted to 945 tons of gold-silver-lead ore.

Skylark.—A lease was taken on this property by Duhamel & Bryant, of Greenwood, and 30 tons of ore carrying values in gold and silver shipped to the smelter. Three separate leads branching from the original *Skylark* workings were found about 25 feet to the east.

Crescent.—This property was leased by Geo. Thompson, of Greenwood, and 7 tons of ore carrying gold, silver, and lead was shipped.

Last Chance.—James Poggi, of Greenwood, leased this mine and shipped 26 tons of gold and silver ore. It is understood that most of the ore was picked from the old dumps.

Carmi.

Carmi.—The construction of the 75-ton concentrating plant commenced in 1919 has not been completed yet. It seems a pity that the money spent in attempting to construct a plant at a time when prices were very high and labour scarce was not used for developing some ore, which may be badly needed when operation starts.

Phoenix.

Granby Consolidated Co.—The dismantling of the underground and surface plants at the mines at Phoenix was finished in the early autumn and the town is now practically deserted. Such tonnage as remained in the mine was distributed in such a way as to make the mining of it expensive, and this factor, together with the high cost of supplies and the falling price of copper, made profitable operation impossible.

The concentration of the remaining ores was considered by the company, and it was found that after an outlay of about $75,000 for a new plant, plus the expense of moving and installing some of the old crushers, etc., the cost would average about 18.70 cents a pound of copper produced. It is understood that about 600,000 tons of mixed ore distributed over a large area still remains in the mine.

OSOYOOS MINING DIVISION.

Horn Silver Mine. This mine, under the management of the Condit Bros., of Similkameen, continued active operations throughout the year. Development-work on the intermediate and lower tunnels amounted to 500 feet. While drifting in the lower tunnel the lead was lost in a slide near the surface on the slope of the mountain. A crosscut tunnel was driven about 50 feet beyond the slide and the lead again picked up, averaging about 4½ feet in width and containing values of 41 oz. in silver and 0.12 oz. in gold to the ton. There seems to be little possibility of a further disturbance of the

lead for several hundred feet, other than the usual step-faulting. The average number of seventeen men was employed and 1,523 tons of silver and gold ore shipped to Tacoma and Trail smelters.

Hedley Gold Mining Co.—This company worked the mine and mill until the autumn, when operations ceased on account of conditions which cut down any margin of profit to a minimum. It is probable that some development-work will be done in the near future. The total tonnage milled amounted to 39,400 tons, carrying values in gold, silver, and arsenic.

Fairview Camp. The high-power electric line between Princeton and Greenwood, now in operation, passes through this camp. With this means of acquiring power for operation purposes, it seems likely that the old *Stemwinder* and *Morning Star* groups of claims, which have lain idle for many years, will once more command attention. On the *Stemwinder* a shaft has been sunk for about 500 feet and crosscuts driven from this shaft to the vein. During the time of the writer's visit to this camp the old workings were filled with water, so no samples from underground could be taken nor an examination made, except over the surface. From some of the older reports when the mine was in operation it may be learned that the vein, which is mainly quartz, varies in width between 12 and 20 feet and carries values from $5 to $10 a ton in gold.

Formerly, a stamp-mill, concentrators, and cyanide plant were erected to treat the ores, but this plant has now been dismantled and sold for scrap. The vein can be easily traced for several hundred feet in the schist and quartzite. Two tons of concentrates was shipped in 1920 to the Trail smelter, having a total content of 6 oz. in gold, 102 oz. in silver, and 181 lb. of lead.

Morning Star Group. This group consists of the *Morning Star*, *Diamond*, and *Star*, and is owned by Steve Mangot and Dan. McEachern, of Keremeos. The *Morning Star* adjoins the *Stemwinder* and was worked about the same time (1901). A considerable amount of development-work was done; i.e., a shaft 300 feet deep, open-cuts, and a short tunnel. The lead averages about 20 feet wide on the surface and contains free gold, mixed with lead and zinc (the zinc is gold-bearing) in a gangue of quartz and schist, stained with iron oxides. The values seem to vary between $5 and $12 to the ton. A thorough examination was impossible on account of the shaft being full of water. The surface showings are very persistent and can be traced for several hundred feet.

Copper King.—This property, near Olalla, was leased to A. Hagelberg by R. W. Northey and only assessment-work was done.

Golconda.—The development of this property, near Olalla, was carried on in the lower tunnel by the owners, McEachern Bros., with the idea of cutting the ore-body already developed in the upper workings. The ore is copper sulphides with a considerable amount of molybdenite.

Indiana and Fairview. These claims have been staked by Joe Armstrong, of Chopaka, Wash., U.S., and are situated on the Indian reserve, about 14 miles below Keremeos. No development-work other than a little stripping had been done at the time of the examination. The lead, varying between 1 and 6 inches in width, contains native silver, pyrargyrite, argentite, and other sulphides of silver and iron in a gangue of quartz, and occurs as a fissure in the granitic rock. The vein, which is exposed for about 100 feet at the toe of a bluff, has evidently been badly fractured and its commercial value cannot be estimated until some development-work is done. A picked sample gave 0.02 oz. in gold and 82.50 oz. in silver to the ton.

Dallas. This group of claims, consisting of the *Dallas*, *Independence*, *St. James*, and *Terminal City*, is situated about 6 miles from Keremeos, on the old Fairview-Keremeos wagon-road, and has been worked spasmodically by J. Patton, of Keremeos. The vein-matter is chiefly quartz containing small segregations of ore. The peculiar brass-yellow colour of the ore, together with its high gold content, probably places it amongst the tellurides. Unfortunately, as far as development shows, the segregations of mineral are somewhat rare. The vein is well defined and averages about 3 feet in width in a schistose formation.

Hidden Treasure Group. This group adjoins the *Dallas* claim and is owned by J. Pitman, of Oroville, Wash. Several large and well-defined quartz veins have been prospected by tunnels and shafts, and at the time of writing this report only low values in gold and silver had been found. The country-rock is schist.

Prince. This claim is situated on the west side of the Ashnola river, about 5 miles up the river from the Great Northern Railway, and is owned by Dunc. Campbell and Thomas, of Keremeos. The lead occurs as a fissure and is mainly quartz, varying in width between ½ and 18 inches, and carries values in lead and silver. The country-rock is greenstone and quartzite, intruded by porphyry dykes.

Rawhide. This claim was staked many years ago, about the time the *Nickel Plate* mine was discovered, and a few open-cuts were put in on the pyrrhotite capping. Only low values were recovered. Nothing was done on the claim until recently, when a tunnel 15 feet long was driven under the capping, which developed a mineralized zone carrying chalcopyrite and some gold values in a gangue of quartz and calcite. The location of the claim is approximately 9,000 feet in a north-westerly direction from the town of Hedley, on the west side of 20-Mile creek.

Silver Crown, Silver Leaf, and North Pole. These claims are situated close to Osoyoos lake, adjoining the International Boundary-line, and are an extension of the *Submarine* group (now in litigation), located in the United States. The owners are Al. Hagelberg and Paul Nelson, of Oroville. A bond has been given to the Southern Minnesota and Oroville Mining Company. On the *Silver Crown* a tunnel 80 feet long has been driven, developing streaks of silver, lead, gold, and copper ore, and one vein about 4 feet wide. The values seem to be divided amongst these minerals, which makes the ore rather complex. The walls of the lead have not been discovered in this tunnel, but a surface estimate places them at about 20 feet apart. Another tunnel has been driven 20 feet and a shaft commenced at the end of the tunnel in an endeavour to find the foot-wall. The small streaks in this tunnel carry high values in silver and 0.50 oz. in gold to the ton.

The vein-matter is composed of crushed biotite granite and the streaks of ore are so intermingled that it is impossible to sort it. A concentration plant will probably be necessary. The strike of the vein is in an easterly and westerly direction and the dip nearly flat, a little west of north.

White Lake Coal-Basin. This basin is situated on the western side of the Okanagan valley, about 6.5 miles in a south-westerly direction from Okanagan Falls, in Township No. 53. About twenty years ago some shafts were sunk in the centre of the basin and a narrow seam mined for coal, which was used for blacksmithing purposes at Fairview. Very little information is available concerning the quality of the coal or size of the seam, except that it was of a bituminous nature. The area of the field is about 6 square miles, which includes nearly all the low-lying lands in the basin. The property is owned by R. Hookham and Reynolds, of West Summerland.

The development-work done upon the coal-beds consists of open-cuts and shallow shafts and one shot-drill hole about 35 feet deep. One old shaft filled with water is said to be about 100 feet deep. Samples were taken of the cleanest coal from four different locations.

No. 1 seam, about 14 inches wide; No. 2 seam, about 24 inches wide; No. 3 seam, about 40 inches wide; and No. 4 seam, about 30 inches wide, were sampled and analysed as follows:—

Contents.	No. 1.	No. 2.	No. 3.	No. 4.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Moisture	6.1	8.6	8.0	12.5
Volatile and combustible matter	23.5	27.5	21.6	18.6
Fixed carbon	57.3	52.8	41.3	55.9
Ash	13.1	11.0	29.1	13.0

The nearest railway point is Penticton about 12 miles distant on Okanagan lake at an elevation of approximately 900 feet lower than the basin-rim. The main wagon-road from Fairview to Penticton runs through the property.

Coal-bearing rocks cover the area of the basin and consist of tufaceous sandstones and true tuffs, shales, conglomerates, breccia, and thin seams of coal. The beds are probably about 2,000 feet in thickness, unless there has been some slipping and faulting, which would cause a duplication. Both the sandstones and shales contain a great many plant remains, and the age, from a small selection of these, was placed as Oligocene.

An examination of the possible coal area was confined to the surface, with the exception of a few open-cuts and two shafts about 25 feet deep, which rendered it very difficult to make any definite statement regarding the commercial value of the field. The coal wherever exposed was dirty, which is probably due to descending waters and its proximity to the edge of the field. The analyses show a high percentage of ash and moisture which may disappear at depth. The coal is bituminous and, if larger and cleaner seams can be developed, should find a ready market.

Owing to the volcanic activity, which evidently took place after the deposition of the coal, it is possible that there may be a considerable amount of faulting, which might have carried a contaminating matter into the coal-beds. The analyses of the samples taken from a moisture and ash standpoint is not attractive, and it seems advisable for the owners to develop, if possible, a cleaner coal before taking the matter up with capital.

The cost of drilling would probably be between $3 and $4 a foot at the present time and it seems the cheapest way to develop the property. A drill-hole near the centre of the field dipping to cut the formation at right angles and well away from any igneous intrusions might be suggested, as there would be less chance of contamination from dirt and water.

SIMILKAMEEN MINING DIVISION.

Canada Copper Corporation, Copper Mountain.—The electric power from the South Kootenay power plant at Bonnington Falls and Cascade was supplied to the mine on Copper mountain on October 19th. Sixty thousand volt current is delivered at the mine sub-station and transformed to 2,200, 550, and 110 volts.

The machinery now installed comprises the following: One Rand duplex cross-compound compressor of 3,000 cubic feet capacity, driven by a 2,200-volt, 600-horse-power motor with a rope-drive; one Rand duplex compound compressor of 2,500 cubic feet capacity, driven by a 2,200-volt, 400-horse-power motor with rope-drive; one Rand cross-compound compressor of 1,000 cubic feet capacity, driven by a 2,200-volt, 150-horse-power motor, belt-driven; total capacity, 6,500 cubic feet a minute. A 14 by 20 Jencks geared hoist installed at the Main shaft; two motor-generator sets, 150 k.w., 250 volts, D.C., for trolly system and hoist at railway-tram; one 200-horse-power, 2,200-volt motor at the crushing plant, which operates one 42- by 36-inch Farrel-Bacon jaw-crusher and two No. 6 McCully gyratory crushers; two No. 10 and one No. 15 volt motors which run the conveyor-belt, Ross grizzlies, and the shuttle conveyor; one 550-volt, 100-horse-power motor at the river pump which is used to supply the plant and town with water. All this machinery, except the small compressor and river pump, was installed in 1920 and all the necessary pole-lines, etc., run.

The underground work was carried on with a few men all the year until October 18th, when the crew was increased preparatory to active operations. Before the power arrived 10,000 feet of 30-inch-gauge track was laid underground and at the tunnel portals. The haulage system consists of 7,700 feet of trolly-lines.

Four 7-ton Baldwin-Westinghouse locomotives are used to haul the ore-cars to the crushers. The mine-cars are of the Granby type, having a capacity of 130 cubic feet. Underground development was confined to manways and totalled 228 feet. Twelve new cottages were built for the employees.

The mine closed down on December 9th owing to the impossibility of operating successfully on 13-cents-a-pound copper.

Canada Copper Corporation's Mill, Allenby.—The mill started running shortly after operations commenced at Copper mountain. A few changes were found necessary in the flotation plant and the addition of another crusher on account of the extreme hardness of the ore. It is understood that good results were obtained during the short time the mill was in operation. Unless the price of copper advances or the cost of operation decreases, it will be some time before the mine and mill commence to operate.

Copper Farm. This mine is situated about 4 miles from Princeton, on the Similkameen river. The owners have installed a compressor and boiler and have built a new bunk-house and kitchen. It is the intention of the management to drive the lower tunnel ahead 100 feet and connect the intermediate and lower workings with a raise. The lead in the intermediate tunnel is small, but carries good values in copper.

Knob Hill Group. This group is situated on the west side of the Roche river, about 16 miles from the end of the Trans-Provincial highway. In driving a crosscut to develop an outcrop, the owners, John Broman *et al.*, of Princeton, cut an

entirely new ore-body about 10 feet wide and well mineralized with chalcopyrite and chalcocite in a gangue of calcite and quartz. The ore seems to occur as a lens in the schist and is lying parallel to the outcrops of what appears to be another lens. Future development of this claim is looked forward to with interest.

Red Star. Situated on Roche river. Development-work during the year was continued on the lower crosscut, showing no change of ground. The owners expect to cut, in another 20 feet, the lead showing in the upper workings. Both the *Red Star* and *Knob Hill* claims give promise, and should the Trans-Provincial highway be built it is probable that both these claims will develop into shipping mines.

Lucky Pair Group. This group, owned by Chas. Day, comprises four claims—*Lucky Pair*, *G.O.P.*, *Moon Winks*, and *Day & Night*—and is situated on Whipsaw creek, about 22 miles south-west of Princeton. Several open-cuts have been excavated and a good deal of stripping done, and a tunnel 492 feet long has been driven near the bottom of the hill. The open-cuts show segregations of lead carbonates and a considerable amount of iron-stain through the schist. The tunnel was driven on a lead varying in width from 3 inches to 1 foot and carries values up to 6.60 oz. in silver, 10 per cent. lead, and 8.5 per cent. zinc.

S. & M. Group. These claims are approximately 21 miles from Princeton, on the north-west side of Whipsaw creek. The owner, Sam Spencer, has done a lot of development-work near the surface in the fractured zone, which is heavily stained with iron oxides and some lead carbonates, with a few nodules of galena scattered through the crushed rock. These nodules of galena carry high values in silver and lead. It seems probable that the original lead has been crushed and leached, causing an extensive discoloration of the surrounding schist. Until the vein is found in-place the owner will probably have difficulty in attracting capital.

Marion Group.—This group, situated on Whipsaw creek, was reported upon by W. M. Brewer in 1916, and since that time development-work has not opened up any new bodies of ore.

Princeton Coal & Land Co.—This company operated steadily throughout the year on its coal properties at Princeton. The total tonnage amounted to 20,717 tons.

Coalmont Collieries, Ltd., Coalmont.—During the year this company, under the management of Donald McLean, developed the coal areas on its property situated about 2.82 miles south-west of Coalmont, on the Kettle Valley Railway. A new opening was made at the mine and the old one extended along the seam for several hundred feet. This seam averages about 10 feet in thickness, dipping in a southerly direction on an incline of about 18°. A new bunk-house was built for the miners.

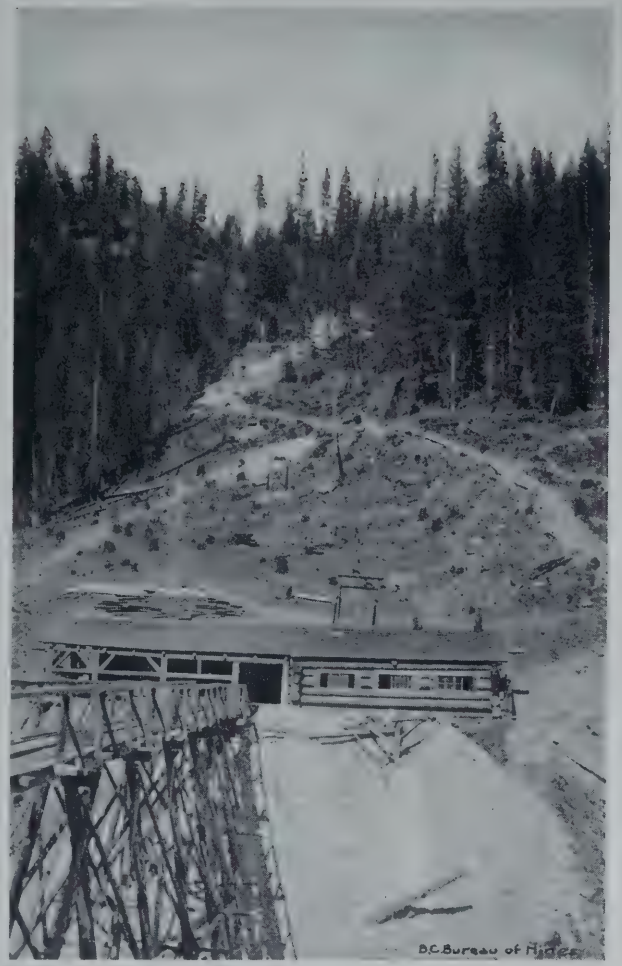
The aerial tram, approximately 15,000 feet long, having a capacity of 60 tons an hour, was installed between the mine and the railway. A tipple and Marcus screens were built at the terminal, also a plant to generate electric power for the mine and town. The company expected to commence operations about the end of the year.

Tulameen Placers.—Chas. F. Law employed three men on the old *Swan* placers near the mouth of Slate creek. An old shaft was unwatered and retimbered and a new tunnel driven in the face of the bluff in an attempt to strike bed-rock.

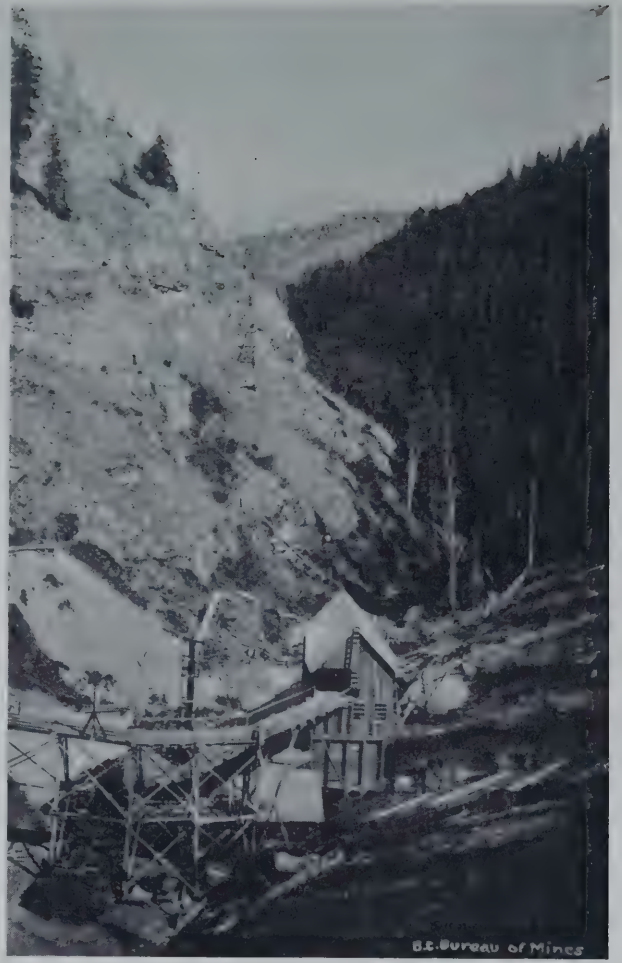
Other parties worked on the Tulameen River placers, the results of which are not to hand.

Summit Camp. This camp is situated near the divide between the Tulameen and Coquihalla rivers, on the headwaters of Sutter and Amberty creeks. W. H. Hess, of Tulameen, acquired the *Mountain View*, *Blue Bell*, *Sutter No. 1* and *No. 2* claims from Andy Jensen, of Tulameen. A good deal of surface prospecting was done and the lead traced for about 1,500 feet on the *Mountain View* before any underground work was undertaken. A tunnel is being driven under the outcrop which will give a depth of about 75 feet. The outcrop in the open-cuts shows oxides and carbonates of iron, also sulphides of iron, as well as calcite, manganese oxide, and some cubes of galena. A picked sample from this showing gave 22 per cent. lead and 40 oz. in silver to the ton.

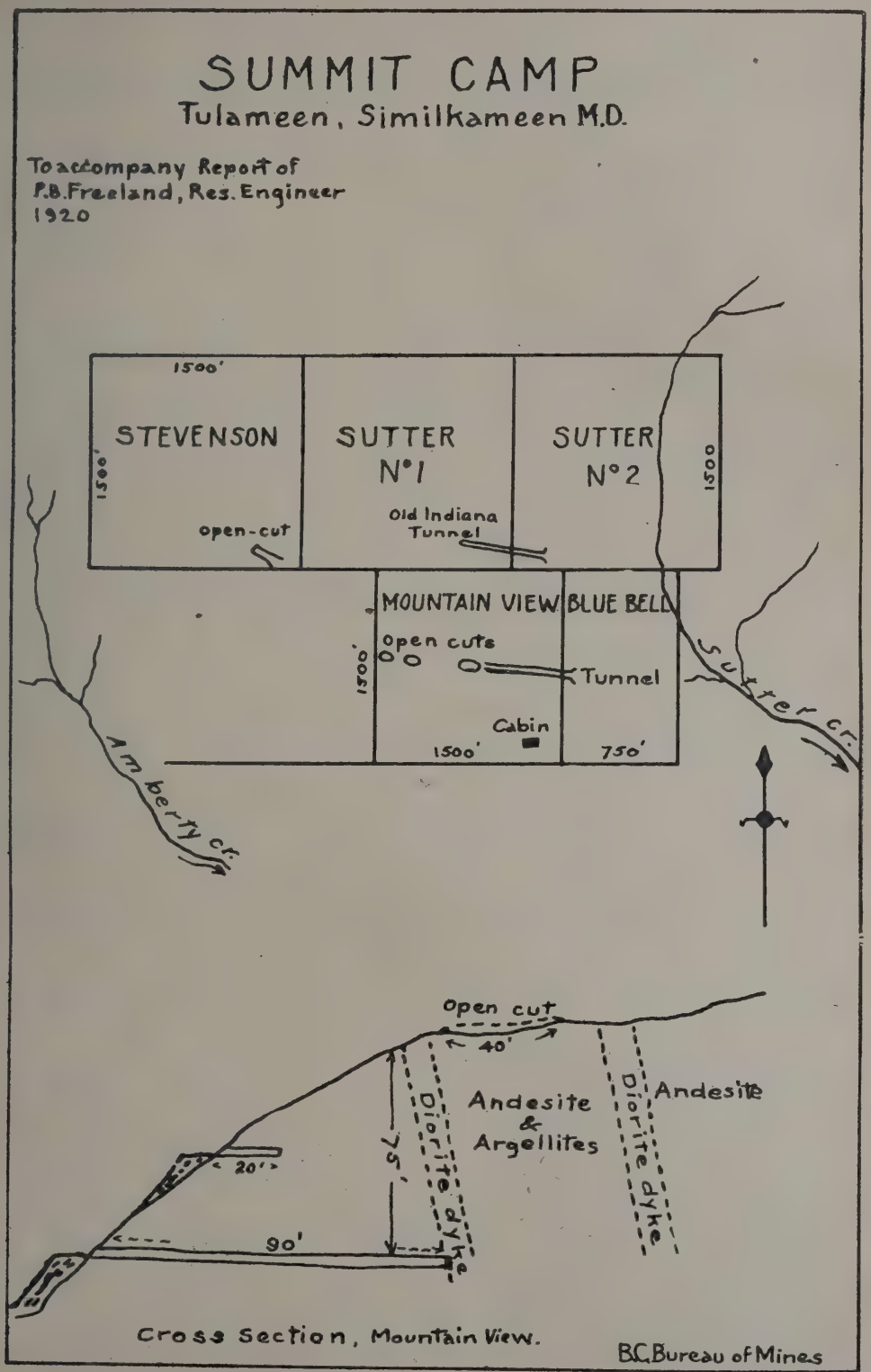
The first 40 feet of tunnel was mineralized with iron and zinc sulphides, which changed to calcite, quartz, and iron carbonates. The lead strikes in an easterly and westerly direction and dips to the north. The country-rock in this vicinity seems to be andesite intermingled with slates and limestones and cut by a series of dioritic dykes.



Rock Candy Mine—Workings.



Rock Candy Mine—Sorting-house.


SUMMIT CAMP
Tulameen, Similkameen M.D.
To accompany Report of
P.B. Freeland, Res. Engineer
1920
1500'
STEVENSON
SUTTER N°1
SUTTER N°2
1500'
1500'
open-cut
Old Indiana Tunnel
MOUNTAIN VIEW
BLUE BELL
open cuts
Tunnel
Cabin
1500'
750'
Amberly cr.
Sutter cr.
Open cut
40'
Andesite & Argellites
Diorite dyke
Andesite
Diorite dyke
75'
20'
90'
Cross Section, Mountain View.
B.C. Bureau of Mines

A new log house 16 by 18, a kitchen 12 by 18, a barn 12 by 14, a blacksmith-shop 12 by 12, and a 14 by 30 snow-shed over the mouth of the tunnel have been built.

Future development of these properties is looked forward to with great interest, for in other parts of the camp several strong leads of silver-lead and zinc have been partially developed, but nothing done to try and place the camp on an operating basis.

BOUNDARY DISTRICT.

GREENWOOD MINING DIVISION.

Report by W. R. Dewdney, Gold Commissioner.

I have the honour to submit my annual report on mining operations in the Greenwood Mining Division for the year 1920.

Near Greenwood.

Providence.—This mine shipped 945 tons of lead ore to the Trail smelter, containing 578 oz. gold, 148,613 oz. silver, and 32,479 lb. lead; the gross value being about $141,000. The average number of men employed during the year was thirty-one monthly. The mine was leased to A. J. Morrison and Dan McGillis by Mark Madden and associates, of Chicago; the lease expired in November. The owners are preparing to resume operations.

Elkhorn Fraction.—Owned by R. D. McKenzie. A shaft over 20 feet deep has been sunk on the property with the intention of striking the ore extending from the 400-foot level of the *Providence* mine. Mr. McKenzie expects to reach solid rock at a depth of 50 feet, the shaft being in wash and gravel.

Wallace Mountain, near Beaverdell.

Bell.—Operated by Duncan McIntosh and Pat Crane. Some 264 tons of ore was shipped to the Trail smelter during the year, containing 4 oz. gold, 60,881 oz. silver, and 32,040 lb. lead. The development consisted of drifting 684 feet. An engine-house, blacksmith-shop, and garage were built and a 50-horse-power oil-engine, air-compressor, and air-drills installed; also a 1½-ton motor-truck bought.

Sally.—The development-work amounted to 1,405 feet and 355 tons of ore was shipped to the Trail smelter, with a total silver content of 73,620 oz. Some 45 tons of high-grade ore was in the bins at the end of the year. On the whole, the company, the Wallace Mines, Limited, had a very successful year and the mine is in splendid condition at the present time. Owing to the heavy drop in the price of silver and the high cost of supplies and labour the crew was reduced more than one-half. As soon as these matters are adjusted a full force of men will be put to work.

List of Mines.

The following is a list of mines in the Greenwood Mining Division from which ore was shipped to the Trail smelter during the year:—

	Tons.
Providence, Greenwood	945
Bell, Beaverdell	264
Sally, Beaverdell	355
Castor Fraction, Beaverdell	38
Canada Copper Corporation, Greenwood	20
Crescent, Greenwood	7
Last Chance, Greenwood	26
Kokomo, Beaverdell	1
Napanee, Beaverdell	1
Rambler, Beaverdell	12
Skylark, Greenwood	30
Sunnyside, Rock creek	3
Wellington, Beaverdell	25
Waterloo, Lightning Peak camp	23

Office Statistics—Greenwood Mining Division.

Locations	37
Certificates of work	90
Free miners' certificates issued	84

Free miners' certificates issued (special)	1
Filings	10
Abandonments	3
Bills of sale recorded	9
Permits to search for lode	3
Powers of attorney	7
Certificates of improvement	1
Certificates from Department of Mines	2
Rerecords of placer claims	2
Placer leases granted	5
Layovers	2
Claims leased under "Taxation Act Amendment Act, 1916"	48

Under the "Taxation Act Amendment Act, 1916," the *Tam O'Shanter* claim was leased to A. J. Morrison, formerly lessee of the *Providence* mine. This property is in Deadwood camp and the results obtained from development so far are very encouraging.

GRAND FORKS MINING DIVISION.

REPORT BY S. R. ALMOND, GOLD COMMISSIONER.

I have the honour to submit the annual return of the office statistics of the Grand Forks Mining Division for the year 1920, as below.

As the mining industry in this Division will be covered in the report of the Resident Mining Engineer for the Southern District (No. 4), there will be no need of a report on this head from the Gold Commissioner.

OFFICE STATISTICS—GRAND FORKS MINING DIVISION.

Free miners' certificates	96
Locations	43
Certificates of work	93
Bills of sale	18
Abandonments	2
Filings	10
Certificates of improvements	2
Crown-grants	2
Leases of reverted claims	8
Above since Crown-granted	3

OSOYOOS MINING DIVISION.

REPORT BY JAS. R. BROWN, GOLD COMMISSIONER, FAIRVIEW.

I have the honour to submit the annual report on mining operations in the Osoyoos Mining Division, Yale District, for the year 1920.

I regret that for the year there has been but little improvement in mining matters. There has been a sale and some exploiting of an asbestos property near Okanagan Falls and a new strike near Hedley. On the other hand, the *Nickel Plate* mine at Hedley has closed down.

OFFICE STATISTICS—OSOYOOS MINING DIVISION.

Locations	102
Certificates of work	128
Conveyances	28
Free miners' certificates	190

SIMILKAMEEN MINING DIVISION.

Report by Hugh Hunter, Gold Commissioner.

I have the honour to forward the mining statistics of this office for the year 1920.

Office Statistics—Similkameen Mining Division.

Free miners' certificates	212
Location records	93
Certificates of work	246
Bills of sale	18
Certificates of improvements	19
Record of placer claims	9
Leases of placer claims	1
Powers of attorney (placer)	8

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CENTRAL DISTRICT (No. 3).

REPORT BY R. W. THOMSON, RESIDENT ENGINEER.*

INTRODUCTION.

The Central Mineral Survey District (No. 3) comprises the seven Mining Divisions of Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale.

The mineral production of the Central District for the year has had a considerable proportional decrease as compared with 1919. The only minerals in which increased production is recorded are coal and magnesium sulphate (Epsom salts).

The following table gives the mineral production for 1920, with corresponding figures for 1919:—

	Production, 1920.	Production, 1919.
Gold, lode (oz.)	372	3,158
Gold, placer (oz.)	225	475
Silver (oz.)	1,982	9,252
Copper (lb.)	260,808	556,681
Lead (lb.)	2,720	34,059
Coal (tons)	120,031	116,660
Magnesium sulphate (crude) (tons)	1,800	200

The decrease in the gold-output is almost entirely due to the closing-down of the *Pioneer* mine in the autumn of 1919.

Although there are no important silver-mines in the District, the *Mary Reynolds* mine, near Stump Lake, shipped over 6,000 oz. of silver during 1919; also the *Queen Bess* mine, on the North Thompson, produced about 1,000 oz. from silver-lead ore. Neither of these mines have been operating during the year 1920.

The decrease in the copper-output is accounted for by the closing-down early in the year of underground work at the *Iron Mask* mine, this being the principal producer of metalliferous ore in the district.

Lead.—The principal producer during 1919 was the *Queen Bess* mine. This, as stated above, has not been operating during 1920.

Coal.—This has maintained its production and showed a slight increase over 1919. Practically the whole output is from the Nicola coalfields in the vicinity of Merritt.

Increasing activity has developed during the year in the production of magnesium sulphate. The shipments from the Clinton lake were sent to Oroville, Wash., for treatment; those from Basque were sent, some to the Eastern market direct, and some to Vancouver for cleaning in the company's refining plant there.

The production to date of this district as a whole is small compared with the total production of the Province, but the outlook for the future is most promising, considering the potential resources as indicated by the results of prospecting-work being carried on. Geologically, the district is highly favoured so far as range of formation is concerned. In the eastern part of this district there are exposures of the Pre-Cambrian rocks in the Shuswap terrain which have scarcely yet been scratched. The northern central area, consisting largely of an elevated plateau is largely composed of ultra basic volcanic rocks not favourable generally to the deposition of valuable metalliferous ores. Development has been proceeding, however, on occurrences of hydromagnesite, magnesium sulphate, sodium carbonate, also chromite, and there is no doubt that some of these will develop into successful commercial propositions. It may be mentioned here that there are possibilities in this north-central area in the way of discoveries in the line of the semi-precious stones. Hyalite, a form of opal, but colourless and of little commercial

* *Note by the Provincial Mineralogist.*—Owing to a rather serious prolonged illness Mr. Thomson has been unable this year to write his usual annual report on his district. Mr. Thomson's Preliminary Report (with production figures revised) has therefore been republished as his annual report, together with a brief report on the Government work at the *Snowstorm* group, Ashcroft Mining Division, by Allan K. Stuart, superintendent, and a report on the *Emancipation* group by the Provincial Mineralogist.

value, is known to exist in considerable amounts in the vicinity of Hihium lake. Specimens of turquoise of commercial grade have been found by Geo. McDonald, of Kamloops, but, as the district in which they were found is very difficult of access, nothing has been done in the way of further investigation since the discovery was made.

In the west, south, and east of the district, where the granitic intrusives have reached their greatest development, we have the occurrences of the more pronounced metalliferous ores, the mineralization occurring not only in the granite, but also in the overlying volcanics and sedimentaries. I shall only mention here a few of the promising areas on which work is being carried out, giving more detail in the later descriptions under the heads of the respective Mining Divisions. The Taseko (Whitewater) limonite-deposit reported on by Wm. Brewer in 1919 has been investigated more fully by the Department of Mines during the present year. The Canadian Geological Survey also had a party under J. D. MacKenzie making a geological survey of this particular district. Assessment-work only has been carried out in the Gun Creek and Tenquille Creek areas. The Cadwallader Creek gold area has been very quiet during the past year. The 23-Mile camp on Skagit river, south of Hope, continues to show increasing indications of large bodies of copper, ore and galena, also small high-grade silver ore. The Ladner Creek-Siwash Creek gold-bearing argillite-belt has had considerable prospective value added to it as a result of work done by the Liberator Mining Company, Limited, operating the *Emancipation* mine. As this belt extends from north of the Fraser river south-easterly across Siwash creek, the Coquihalla river, and 23-Mile camp to beyond the International Boundary on the Skagit, there should be some potential importance accruing to the Hope vicinity as a future supply-point for mining requirements.

An area which should prove of considerable interest is that lying to the south-west of North Barriere lake. The country-rock surrounding the north half of the lake is granite; that surrounding the southern half is a schist, the contact between the two running in a north-westerly direction.

The Government work being carried out in the Highland valley has shown that a very large area of mineralized ground exists in the vicinity, the boundaries having not yet been fully determined. (*See* report following by A. K. Stuart.)

CLINTON MINING DIVISION.

Magnesium Sulphate (Epsom Salts) Lake.—About 1,000 tons of crust was shipped in the early part of the year from Clinton to Oroville, Wash., for treatment.

Watson Bar Creek Placer.—It is estimated by the Gold Commissioner, Clinton, that $2,000 of gold was taken out during the season.

Goodenough Lake (Carbonate of Soda).—This lake lies just to the west of Meadow lake, about 24 miles from the 59-Mile House, Cariboo road. Work largely of an experimental nature has been going on all summer under the direction of Mr. Silverton, of Vancouver, for the purpose of finding the most efficient method of producing the sodium carbonate in crystal form.

Taseko (Whitewater) River Iron-ore Deposits.—F. J. Crossland, under instructions from the Department of Mines, has been carrying out investigations in this limonite area during the summer. J. D. MacKenzie, of the Canadian Geological Survey, with his party, also spent the season in this vicinity.

LILLOOET MINING DIVISION.

Little of importance has taken place in this Division during the year.

In the Cadwallader Creek area the *Pioneer* mine has remained closed.

The *Lorne* mine has continued development in a small way and produced a small amount of gold from development-work.

The *Wayside* and *Ida May* also did some development-work.

Aid to Prospecting by Returned Soldiers.—Two parties of two men each worked in this Division during the season. One party operated in the vicinity of the headwaters of McGillivray and Cadwallader creeks; the other in the vicinity of the headwaters of Cayoosh and Texas creeks. No particularly interesting discoveries were reported, although some claims were staked.

Copper Mountain, Gun Creek.—Assessment-work only has been carried out on this property during the year.

Tenquille Creek Area.—Assessment-work on the several properties in this area has been carried out.

KAMLOOPS MINING DIVISION.

Iron Mask.—Underground operations were suspended in this mine during the early part of the year, but a considerable force of men has been kept at work repairing, making additions to surface plant, and putting in a plant to pump water from the Thompson river to the mine. The main shaft has been retimbered; new concrete foundations to the head-gear put in, and the head-gear practically rebuilt; a new belt-conveyor from head-gear to mill installed and increased storage for treatment liquids provided. Work is proceeding on the pumping plant previously mentioned.

Chu Chua Coal Mining Syndicate.—Trustees, W. H. Glass, 1507 North Thirty-ninth street, Seattle, Wash., and H. W. Schuett, 400 Central Building, Seattle, Wash.; local secretary, C. E. Max, Kamloops, B.C. This syndicate has secured options on approximately 5,000 acres of coal lands about 2 miles south of Chu Chua. A compressor operated by a 50-horse-power steam plant has been installed, a road built to a siding on the Canadian National Railway slightly over a mile away, and camp buildings erected to accommodate about twenty men. Production has been started, working on a 3-foot seam of coal. About 307 tons was produced by the end of the year.

Lynx.—Situated about a mile south-westerly from North Barriere lake; owner, Charles Loucks, Barriere. The country-rock surrounding the north half of the lake is granite; that surrounding the southern half is a schist, the contact between the two running in a north-westerly direction. Two samples were taken from a short tunnel on the property which gave small results in copper and silver. The mineralization continued underneath the section sampled, as the face and bottom of tunnel were all in mineralized ground.

On the *War Colt* group and others in the Thunder creek vicinity considerable work was done during the summer with very encouraging results, but the distance from transportation prevents work being conducted on an extensive scale.

ASHCROFT MINING DIVISION.

Basque Chemical Production Company.—J. G. Miller, manager, 415 Bank of Nova Scotia Building, Vancouver; operating Epsom Salts lakes near Basque. The management is working up a market that augurs well for the success of this company. Approximately 800 tons has been shipped during the year, part of which was treated in their refining and classifying plant in Vancouver.

Snowstorm Group, Highland Valley.—During the past season work has been confined to surface operations on the *Iona* sub-group as a preliminary to drilling operations. As the work of test-pitting advanced the area of mineralized ground continued to increase until an area approximately 1,000 feet across and 3,000 feet in length has been proven to exist. Surface values vary from roughly 0.5 per cent. copper to 2 per cent., with the lower values predominating. The averages from a few pits run as high as 6 and 10 per cent.

On Deadman creek there are some large deposits of diatomaceous earth of good quality.

NICOLA MINING DIVISION.

The principal output from this Division continues to be coal. The Middlesboro Collieries and the Fleming Coal Company have both been operating steadily during the year.

STUMP LAKE AREA.

Donohoe Mines, Ltd., Stump Lake.—This company operated the *Joshua* mine during the early part of the year, shipping 62 tons of ore, but closed down again during the latter part. This was the only property operating in the Stump Lake area this year.

ASPEN GROVE.

Some diamond-drilling was carried out in the southern part of this camp early in the year, but the results were not particularly encouraging. The same interests, however, which held an option on the field last year have turned their attention to the northern part, and intend doing some drilling in this section at an early date.

Views on Texas Creek, Lillooet M.D.

Bentonite.—This is a material of rather unusual occurrence. There is a deposit of this near Quilchena associated with the coal formation. In appearance it is a light-buff coloured, fine-grained, compact rock with a structural appearance which might be described as being between a hard clay and a chalk. When water is added it breaks down into a slimy mud. It is locally known by the name of soap-clay. There is an occurrence of this in Wyoming, where it is being worked on a commercial basis, the material being used largely in the manufacture of paper as well as in the manufacture of certain kinds of cloth.

The following description of "bentonite" is taken from Memoir No. 25 of the Canadian Geological Survey, being a report on "The Clay and Shale Deposits of the Western Provinces," Part II., by Heinrich Ries and Joseph Keele:—

"On the Triangle ranch near Quilchena we found some outcrops of coaly shale and *bentonite.* These outcrop on the lower slopes on the west side of a north-south valley, which is rimmed in by volcanic rocks. The coal-measures strike N. 10° E. and dip 30° S.E., and at a point where an opening was made in search of coal the limited section shows:—

	Feet.
Coaly shale	..
Concealed	10
Bentonite	3
White clay, probably dried bentonite	6
Coaly shale	6
Concealed	..

"The bentonite is dense, with a greasy look and conchoidal fracture. The bed below it is similar in structure, but is white and chalky-looking, and is probably the same material which has dried out on exposure to the sum.

"The bentonite has strong absorbent properties, and this particular sample required a high amount of water to work it up into a plastic mass. It is of no value for brick-making.

"As an experiment a sample of it was mixed with sand in the proportion of 1 to 3, and gave a fair bricklet whose air-shrinkage was 5 per cent. The fire-shrinkage at cone 010 was 0 and the absorption 14.4 per cent. It burned light red.

"The white clay occurring under the bentonite (1776) forms a very stiff plastic mass of soap-like character when wet and cracks badly in air-drying. It therefore behaves similarly to the bentonite.

"The air-shrinkage is high—viz., 12.3 per cent.—and the clay is not of commercial value for the manufacture of clay products. It may be remarked, however, that at cone 5 it burned to a body whose absorption was 5.9 per cent., but is not fused at cone 15.

"Bentonite has been used in the manufacture of soap, as a packing for horses' hoofs, as a diluent for certain powerful drugs sold in powdered form, and as an adulterant of candy. It is also said to have been used in the manufacture of antiphlogistine, and makes a good retarder for cement plasters. Its chief use perhaps has been for filling paper."

VERNON MINING DIVISION.

There has been little doing in this Division in the way of metalliferous production. A company has been formed, however, for the purpose of working up the clay-deposits which exist at Okanagan Landing. It is organized as the Lakeside Clay Products, Limited; manager, Louis J. Ball, Vernon.

During the summer a plant has been installed for the commercial production of brick and some kilns fired. It is the intention of the company to go into the manufacture of drain and hollow tile as soon as developments warrant.

The Enderby Brick and Tile Company made 331 M. bricks during 1920.

YALE MINING DIVISION.

The principal development in this Division during the year has been the operations carried out by the Liberator Mining Company, Limited, operating the *Emancipation* mine; Dr. E. T. Hodge, consulting engineer; Bradford W. Heyer, secretary-treasurer, 1522 Standard Bank Building, Vancouver.

A 50-horse-power Fairbanks-Morse oil-engine and compressor has been installed near the Kettle Valley Railway track, where a siding has been put in. An air-pipe line 3,700 feet in length connects the power-house with the mine, where two drills are being used for development

and stoping purposes. Ore is being sacked for shipment, and results of development indicate increasingly large reserves of ore of a milling grade which is being left in the mine.

The encouraging results of this work mean much for the whole of the Ladner Creek properties.

The following report on the *Emancipation* mine was made by W. Fleet Robertson, Provincial Mineralogist, dated August 28th, 1920:—

"The *Emancipation* group is situated on the south-eastern slope of Emancipation mountain, about 1¼ miles east of Jessica, a station on the Kettle Valley Railway 15 miles east of Hope.

"The property consists of thirteen mineral claims, covering a strip of country from the bank of the Coquihalla river north-westerly up the mountain to about the summit and crossing the track of the railway.

"The Coquihalla river here is at an elevation above sea-level of about 1,330 feet; the railway-tracks are at an elevation of 1,460 feet, while the main workings on the property are some 1,200 feet above the railway-tracks.

"The slope of the mountain averages about 30° and is heavily timbered. An aerial tram 3,000 feet long would convey ore from the mine to the railway siding.

"*History of the Property.*—As near as I can gather, the claims were originally staked by Mike Merrick and partners, prospectors, who did considerable work on the property and shipped some ore very rich in gold under the name of Emancipation Mining Company.

"The mine has been under bond to various parties and is now under bond to the Liberator Mining Company, of Vancouver (capital $1,000,000), of which A. H. McNeill is president; B. W. Heyer, director and secretary-treasurer; and P. L. Lyford and E. M. Jamieson, directors. Dr. E. T. Hodge is consulting engineer, and Thomas H. Kerruish, manager.

"The bond from the Emancipation Mining Company calls for an allotment of 10 per cent. of capital stock to seller, and payments of $5,000 in December, 1920; $5,000 in June, 1921; $10,000 in June, 1922; and $40,000 in June, 1923.

"The Liberator Mining Company is at present raising $50,000 by the sale of 200,000 shares of treasury stock; such money to be entirely spent on development-work.

"*Geology.*—The property is in a district of highly altered sedimentary rocks cut by various dykes and very closely adjacent to the Coast granites. Locally, in the vicinity of the claims, the dominant feature geologically is a large feldspathic dyke, said to be 1,000 feet wide, probably an altered diabase, as unaltered portions of the dyke indicate.

"This dyke appears to cut right through the mountain in a N. 40° W. direction, dipping at angles of 30° to 50° S.W. This dyke seems, at least locally, to form the western boundary of the mineralized area, and in contact with it on the east is an area of slate country-rock, the cleavage of which (although not the bedding) appears to be parallel with the dyke.

"The contact of the dyke and slates is very clearly marked; the lower or hanging-wall of the dyke on the east side being smooth and separated from the adjoining slate by a certain amount of gouge-matter, indicating a subsequent movement on the line of contact. As far as could be seen this dyke wall was not broken in any place.

"To the east of the dyke the slate country-rock seems for a distance of some 60 feet to be more or less crushed, forming a *crushed zone* of that width, to the east of which the slate appears to be comparatively unbroken.

"As far as could be seen from the development-work done, this crushed zone, 60 feet wide, between the dyke and the undisturbed slate represents the limits, in an east-and-west direction, of the zone of mineralization.

"*Mineralized Crushed Zone.*—The crushed zone is bounded on each side by a vein of quartz; on the west, and in contact with the dyke mentioned, is what may be designated as the 'Dyke vein,' and on the east side of the zone is the 'Big Quartz vein,' while between these two are a number of smaller cross-veins, all of which will be described in more detail.

"The Big vein has only been cut at one place underground in a crosscut tunnel, but is traceable distinctly on the surface for a long distance up the mountain beyond any present workings. The continuity of this Big vein and its parallelism to the dyke are very noticeable.

"The Dyke vein has been followed by an adit for over 200 feet, in which the dyke formed the hanging-wall, unbroken. From this 1,200-foot tunnel (1,200 feet above the railway-track) a crosscut has been run easterly across the crushed zone and Big vein to the solid slates. From the adit a couple of winzes have been sunk for about 15 feet, but were full of water and

could not be inspected. Above the adit a stope has been put up for about 30 feet and connects with a short adit on the 1,230-foot level. This Dyke vein is continuous for the length of the tunnel at least and is mineralized throughout, though not evenly. These facts are given as strong evidence of the continuity and regularity of the crushed zone and its features.

"The Dyke vein, as already stated, is continuous for the 200 feet length exposed in the 1,200-foot tunnel and varies in thickness from 6 inches to 3 feet, or roughly averaging 2 feet in width. For the entire length of the tunnel the vein is more or less mineralized, with free gold visible to the eye, together with pyrite, pyrrhotite, and arsenopyrite, the latter always associated with high gold values. The mineralization is stronger, however, in certain shoots, of which three have been found in the tunnel-length forming ore-bodies.

"From these shoots there has been mined, sorted, and sold, as shown by the smelter returns, about 118 tons of ore, netting over $35,000, while there is on the dump at present about 700 tons of second-grade ore, showing by sampling and assays of the management a value of $15 a ton.

"It is only on this vein that any extraction or serious development has been done, and it is quite evident the cost of extraction of the ore should not have been more than half the amount received for the ore. As already noted, only 200 feet of tunnel has been driven, with only 15 feet below the tunnel developed by winzes and some 30 to 35 feet above the tunnel by a stope.

"Should further and continued development on this vein anywhere nearly approach the results obtained with the development already done, and there is every reason to expect it will, this vein alone should make a small but profitable mine and justifies the requirements of the bond.

"In addition to this, we have to the east of the Dyke vein the crushed zone, some 50 to 60 feet in width, of brecciated slate, cut by several series of smaller quartz veins from 6 to 18 inches wide, which are evidently and visibly mineralized with arsenopyrite carrying gold values, forming a network which it is quite probable may prove high enough grade to mine as a whole and mill.

"The Big Quartz vein, from 5 to 25 feet wide, lying between the crushed zone and the undisturbed slate, has been prospected on the surface extensively and everywhere carries values, but too low on the surface to be attractive, but the vein underground looks as though it might be rich enough for milling-ore.

"There is but one crosscut through this crushed zone and the Big Quartz vein, so these are only seen at one place underground, an amount of development-work quite inadequate to form any definite estimate of their value. Should further development and crosscutting substantiate this present expectation, there would be proven a very large tonnage of milling-ore and the making of a large low-grade mine.

"The conditions as regards mining, timber, water-power, transportation to the railway, etc., are ideal for cheap work.

"The company has on the ground and in process of erection a gasolene-driven air-compressor and has a 3-inch pipe-line almost completed to the mine."

B.C. Silica and Talc Company.—Executive offices, 204-6 Crown Building, Vancouver; David McMaster, manager. The property consists of five claims situated along the north side of the Canadian Pacific Railway between Chaumox and the Nahatlatch river. A good road has been constructed from Chaumox to the principal talc and silica occurrences.

23-Mile below Hope, on the Skagit.—The assessment-work on the *Diamond* group continues to show increasing bodies of ore. Also work on *Mammoth* group shows interesting mineralization of scheelite in combination with pyrrhotite.

Strontianite is found on the *Defiance* group, across the valley from the *Mammoth* group.

SNOWSTORM GROUP, HIGHLAND VALLEY, ASHCROFT DIVISION.

REPORT BY ALLAN K. STUART, SUPERINTENDENT.

I have the honour to submit the following particulars of the surface development-work carried out under the "'Mineral Survey and Development Act" on the *Snowstorm* group of mineral claims in the Highland valley, Ashcroft Mining Division, during the year 1920. The work done under the diamond-drilling contract let by the Department of Mines in 1919 has already been dealt with in the report of the Resident Engineer, R. W. Thomson, and published in the Report of the Hon. the Minister of Mines for that year.

The tunnel on the *Iona* claim, which had been started at the same time that the whole *Snowstorm* group of claims was being surveyed by W. S. Drewry, D.L.S., in November, 1919, was carried to a distance of 280 feet, when instructions were received on May 27th, 1920, to also put in a series of test-holes on the surface. Sixty-two test-holes and cuts, many of them averaging over 20 feet in depth, owing to the very heavy overburden, were put down on the *Iona* claim; the result of this work showed that while the mineralized occurrence gave low assay averages, still proved the fact that it covers a large area, which well deserves further development at depth to reach the zone of secondary enrichment. Details of the results obtained are shown on plans prepared, but which would take up too much space to refer to in detail in this report. The last work on the *Iona* claim was the sinking of a shaft down to a depth of 40 feet. A combined average of this shaft down to 40 feet gave 1.50 per cent. copper.

Orders were received on January 5th, 1921, to stop further surface work pending the calling for tenders for drilling.

LILLOOET DISTRICT.

LILLOOET MINING DIVISION.

Report by John Dunlop, Gold Commissioner.

I have the honour to submit the annual report on mining operations in the Lillooet Mining Division for the year ending December 31st, 1920.

The *Lorne* and *Pioneer* mines on Cadwallader creek, Bridge river, during the past season were comparatively inactive, and with the exception of about 30 tons of ore treated on the premises by the former, of rock mined during the winter of 1919–20, the milling and recovery of bullion ceased. The stamp-mill at the *Pioneer* mine remained idle. Both of these properties have for years held a conspicuous position as gold-producers; the apparent inactivity may be accountable as directly attributable to the present abnormal conditions. The management of these mines, with the services of small crews, confined attention to development-work, and operations were carried on during the year in that direction.

The *Wayside* and *Ida May* mines, while not classified as bullion-producers, likewise marked time by extending tunnels and stripping some of the surface lodes.

The Anderson Lake Mining and Milling Company's property on McGillivray creek, for some years dormant, was represented by the Brett Bros. The tunnels were thoroughly overhauled, with the aid of a small force development-work was carried on to the satisfaction of all parties interested.

Beyond the annual assessment-work required under the provisions of the "Mineral Act," there is but little to comment upon, as the season's operations disclose no outstanding feature worth while reporting.

Attention has been given the Bridge river and tributary creeks, where forty-six placer-mining leases have been issued during the year.

Office Statistics—Lillooet Mining Division.

Free miners' certificates issued	185
Mineral claims recorded	124
Certificates of work recorded	251
Placer-mining claims recorded and rerecorded	3
Placer-mining leases in force	59
Transfers and agreements recorded	92

Revenue.

Free miners' certificates	$1,024 00
Mining receipts, general	5,834 30
Tax, Crown-granted mineral claims	391 50
Mineral-tax	1,216 74
Total	$8,466 54

CLINTON MINING DIVISION.

Report by G. Milburn, Gold Commissioner.

I have the honour to submit the annual report of the Clinton Mining Division for the year ending December 31st, 1920.

Fewer mineral claims were recorded during the year of my report than during the preceding year, but interest, as indicated by the number of certificates of work issued, kept up at about the same level.

It would appear that comparatively few of the claims staked for hydromagnesite, of which there were a considerable number during 1919, have been kept alive by assessment-work or payment in lieu thereof. This fact, I think almost wholly accounts for the difference in the number of claims recorded in the past two years.

Some of the larger fields of hydromagnesite probably did not come up to expectations in respect to purity and the samples taken did not prove the ground worthy of development.

It is interesting to note the nature of the minerals found in this Division, comprising that noted above and magnesium sulphate and sodium carbonate. The value of some of these deposits is apparent from the fact that on nineteen claims payment of $100 was made in lieu of work in order to obtain the necessary certificate of work to keep the claims alive.

The Stewart-Calvert Company, Inc., with refinery at Oroville, Wash., U.S.A., shipped magnesium-sulphate salts from the lake, situate about a mile south of Clinton, to the extent of about 2,000,000 lb. The whole amount was transported by the Pacific Great Eastern Railway.

The salts were ground and sacked at the lake and conveyed to the railway by motor-truck, whence a large proportion was carried direct to consumers and the less pure to the refinery at Oroville. The regrettable sudden death of the active member of the company, Frank Calvert, temporarily held up this firm's plans for extension of their activities, but I understand that as soon as arrangements can be completed a refinery will be established at the lake.

Three-mile lake, being 2 miles farther south of the one from which salts are now being extracted, also contains similar salts and the two lakes will justify the refinery.

The sodium-carbonate deposits have been receiving considerable attention this year, and, while none has been shipped, there is no doubt that extraction and shipping will result during 1921.

The Lillooet Soda Syndicate commenced work on its plant for the extraction of soda from the Crown-granted claims, *Goodenough* and *Last Chance*, situate near the Canoe Creek road, about 35 miles north of Clinton. These claims are something over 12 miles from the 59-Mile House Station on the Pacific Great Eastern Railway, and this will entail carriage of the product over a good road by auto-truck.

From the existing road to the claims about 1½ miles of road had to be built, and this has been done under promise, conditionally, of assistance from funds authorized under the "Mines Development Act."

The Soda Mining and Products Company, Limited, of Vancouver, has been incorporated and has taken over valuable deposits in the vicinity of Clinton and the 74-Mile House, and active operations are to be conducted during the ensuing season.

The American Nitrogen Products, Inc., Seattle, Wash., has acquired interests in the district and apparently intend producing as soon as they have matters properly lined up.

The Meadow Lake hydromagnesite-deposit, which at the date of last year's report was in litigation, is, I am informed by the successful litigants, to be worked next season, and by reason of its exceptional purity will readily find a market. This deposit is a few miles distant from the railway and will be another industry to engage motor-trucks on the roads.

Prospecting for metalliferous ores has again been carried out on the claims 6 miles south of Clinton by Martin J. Ravey and S. F. Mead, and assessment-work was recorded on a large number of the claims. Apparently nothing of importance was uncovered, but the country is regarded by these gentlemen as excellent ground for prospecting and they are most optimistic for the future.

The *Mad Major* group, referred to last year, was further developed and prospected and assessment-work was again recorded. I have no information touching on results from the work done.

Recovery of gold by placer-mining was this year only about half of the amount washed out last year. This was due to the fact that the miners were out prospecting other ground, when the water came down a little out of season in their absence and so was lost. The value of the gold recovered, as far as I can learn, was about $2,500.

One placer-mining lease was issued during the year and it covers ground on the First North fork of Watson Bar creek. The lessee, David Johnson, regards it as a nice property, especially in view of the downward trend of general commodity prices, which increases the buying power of the gold.

Office Statistics—Clinton Mining Division.

Free miners' certificates	71
Mineral claims recorded	119
Certificates of work issued	102
Placer claims recorded	3
Placer claims rerecorded	16
Bills of sale, etc.	37
Placer-mining lease issued	1

Revenue.

Free miners' certificates	$ 310 50
Mining receipts, general	2,742 20
Total	$3,052 70

TASEKO VALLEY IRON-ORE DEPOSITS.

Report by F. J. Crossland.

To the Honourable William Sloan,
Minister of Mines.

Sir,—I have the honour to submit herewith my report on the Taseko Valley iron-ore deposits.

Introduction.

Under special instructions received from the Hon. Wm. Sloan, Minister of Mines, and under the provisions of the "Mineral Survey and Development Act," the writer, with a field party of five men, proceeded on June 3rd, 1920, from Vancouver to the Taseko Lake and River section of the Clinton Mining Division in order to examine the occurrences of limonite or bog-iron ores in that locality, and to ascertain by development and exploration work the extent, quality, and accessibility of the deposits. The route followed to reach the district was via the Pacific Great Eastern Railway from Newport to Lillooet, where pack-horses and supplies were secured; thence by launch via Seton lake to Shalalth, a station on the Pacific Great Eastern Railway at the foot of Mission mountain, from which place the Bridge River wagon-road was followed to the bridge crossing at Gun creek. The new trail which was constructed up Gun creek was followed to its northerly terminus at Green lake, a distance of about 30 miles. There are alternative routes from this point—viz., Taylor pass and Warner pass—the altitudes being 6,900 and 7,800 feet respectively. After a reconnaissance it was decided to proceed up Warner pass, as the snow was found to be too deep for the passage of horses through the basins approaching Taylor pass, though the pass itself is nearly 1,000 feet lower in altitude than the glacier of Warner pass. After negotiating the above pass the upper valley of the Taseko was reached. The distance travelled by the route described is about 85 miles from Lillooet and 200 miles from Vancouver, though the locality herein described is approximately not more than 75 miles in a direct line to the salt water of one of the Coast inlets.

Geography.

The area covered by this report is roughly about 15 square miles and embraces the upper part of the valley of the Taseko, formerly the Whitewater river, and its tributaries, as shown on the accompanying sketch-maps. The section which this report treats lies between the Coast range of mountains and the Interior plateau. The Taseko river has its source from the westerly slope of a chain of small glaciers and high peaks that reach elevations between 7,000 and 9,000 feet. This range of mountains forms the watershed between the creeks tributary to the Bridge

river on the easterly side and the drainage system of the Taseko river and lakes on the westerly side, and is the dividing line between the Lillooet and Clinton Mining Divisions.

GEOLOGY.

The valley of the Taseko river is geologically situated on the eastern edge of the Coast granite batholith. The rocks forming the mountain chain on either side of the upper valley of the Taseko river belong to a series of volcanic flows of Tertiary age. This zone of volcanic rocks consists of rhyolites, andesites, andesitic tuffs, breccias, and agglomerates. The north-westerly side is bounded by a high mountain range built up by basaltic flows having the usual palisading structure, which forms a prominent landmark and has become known from its characteristic appearance as the "Battlement range." The eastern flank of this belt of Tertiary volcanics consists of rugged snow-covered granite mountains which form the divide and pass into a lower and more subdued range system which is transitional eastward into the Interior Plateau system. The zone of volcanic rocks is approximately 5 miles wide and extends from the head of the Taseko river and roughly parallel to the stream for a distance of at least 15 miles westerly to the Taseko lake.

The valley itself is a basin-like field, being at no point more than a mile wide and curving inward to meet the group of peaks which protrude through the encircling snow lying on the sides of the basin, many of which are permanent snow-fields and form the source of the river. Evidence of glaciation is quite pronounced, and some of the small glaciers are still actively producing changes in the grinding-down of rock-masses in their vicinity, which accounts for the immense size of the talus-deposits which cover the lower slopes of the surrounding mountains and often down to the floor of the valley itself.

CHARACTER OF ORE-DEPOSITS.

Everywhere in this area the iron-ore deposits consist of bedded limonite, a variety of bog-iron ore, occurring mostly in platy layers of varying thickness. Covering some of the deposits are layers of disintegrated brown earthy limonite which have weathered to a crumbly pulverulent mass sometimes a foot thick, and ranging in size from a grain of powder to fragments an inch or two across. Below this loose covering the ore is found compact, with a solid laminated structure paralleling the slope or floor of the basin, on which it has been laid down in successive layers during the transformation of the iron sulphates in the surrounding rock.

The deposits, being of secondary origin, are formed by the general circulation of water through iron-bearing rocks, often absorbing a vegetable acid which assists the water to take up iron in solution. Ferruginous minerals are amongst the first and earliest that fall a prey to alteration; carbonic acid in the water aids in dissolving out the iron in the surrounding country-rock. The organic acids also play a part, and the resulting alteration of the iron affords sulphuric acid and ferrous sulphate which readily enter into solution by the decomposition caused on the admission of air; ferric hydrate soon forms. Evidence of this process is borne witness to by the limonitized roots, twigs, and fir-needles found in the ore-beds that have been wholly or partly transformed to limonite.

This ferric hydrate — i.e., limonite ($2Fe_2O_3$, $3H_2O$) — is formed as a red scum which, following the law of gravity, is carried to the basins, where it gradually accumulates. Theoretically, therefore, the flatter the pitch the greater will be the quantity deposited, and in this respect much depends on the physical features of the floor of the original bed-rock to account for its varying thickness even over a small area covered by an individual deposit. On all the surrounding hills, the rock-masses of which are composed of cherty ironstone and rhyolite impregnated with pyrite, rusty impregnated water can be seen percolating down the hillside, carrying the light films of limonite which accumulate in the form of bog-iron ore-beds in the basins below.

The number of deposits herein described consist of eight widely separated groups or sections, each of which is made up of a number of ore-beds, which are shown in the accompanying sketch-plans and map. The analyses of samples taken in different ways with a view to arriving at the average character and quality of the ore agree very well as to the homogeneity of the different deposits and emphasize the purity of the iron ore.

In order to arrive at the surface area covered by the deposits, traverses were run at intervals of 100 feet and the mean of the width and length of the ore blocked out for that section. The

Bedded Limonite Ore, Taseko River.

Trench in Limonite, Whale Mountain.

Limonite-deposit, Burton Creek, Clinton M.D.

Burton Creek, looking West towards Battlement Range.

Taseko Limonite-deposit, Iron Creek, Clinton M.D.

Taseko Limonite-deposit, Burton Creek, Clinton M.D.

thickness of the ore-beds was determined when possible by the open-cut or trench method, but where the depth exceeded 3 feet pits were sunk until the ore-body was penetrated. In this way an accurate estimate of the amount of ore in each block of each deposit was made.

NOTE.—In computing this tonnage of ore, I have calculated it on the basis of 16 cubic feet of the ore in-place to the ton of 2,000 lb., though its specific gravity of 3.5 would indicate that a less cubic measurement would equal a ton in weight. This estimate was arrived at after cutting out a measured block of average ore and weighing the same after drying, and no doubt, after allowing for some moisture still in the ore, this estimate of 16 cubic feet to the ton would be found to work out correct in mining practice.

The description of each of the different deposits is as follows:—

Section 1.—This group of deposits occurs at an altitude of 6,500 feet on the upper part of the U-shaped valley of Burton creek, which is here about 1,000 feet above the floor of the Taseko valley. There are four detached exposed bodies of limonite ore, all irregular in shape, extent, and thickness, and the ore-beds are all covered by a gravelly ore from 2 to 10 inches deep, which is underlaid by hard beds of massive laminated ore. As the depth of ore varied considerably, even within short distances of 100 feet, a number of pits and trenches were dug to penetrate the ore so as to arrive at the average depth and amount of ore in each individual deposit, the results of which are given in tabulated form, together with analyses and assays of ore samples made by the British Columbia Bureau of Mines.

Section 2.—These deposits, known as the "Whale Mountain group," are on the right or easterly bank of the Taseko river about 2 miles from the head of the valley. The two main exposures have been swept bare of timber by a recent snowslide which shows its course for a distance of about 5,000 feet by 500 feet wide. Three test-pits from 7 to 12 feet deep were sunk in the larger of the two deposits and the ore penetrated at 6 feet 6 inches, 9 feet, and 10 feet 6 inches respectively—this proving a conservative average depth of 9 feet. The trenches cut through the smaller deposit, which is only separated from the latter by about 100 feet of boggy hummocks, showed its greatest depth to be not more than 3 feet, and would not safely average more than 2 feet for the whole ore-bed.

In addition to these two prominently exposed beds there are a number of smaller exposures, separated by short intervals of debris and light vegetable growth, and extending northerly for a considerable distance to the foot of Whale mountain. A number of pits and open-cuts were dug, besides considerable stripping of the overburden over a large area, and the limonite ore found beneath showed varying depth, from a few inches to 7 feet in thickness. In estimating this as a probable area of 3 feet in depth, I have done so with a view of demonstrating, as the exploration-work proved, that the exposed boundaries of the beds of ore are not always the limit of their lateral extent, as in some of the areas here described the ore-beds were found underlying a covering of moss and talus. Where this was positively proven the area covered is referred to as "probable ore," though it is questionable if the ore could be recovered, as the cost of removing the overburden would in most cases not be warranted by the value of the iron ore, especially where 2 feet of debris covers only a like thickness of ore, though in some instances there are places where only a light mossy growth conceals ore-beds 4 or 5 feet deep; they are generally small irregular masses.

Section 3.—The main deposit of limonite in this group lies on the northerly bank of Feo creek near its source at an altitude of 7,000 feet. The valley of the creek is a succession of benches bare of timber and the stream flows between steep banks varying from 50 to 100 feet high. The deposit is 800 feet in length and has a mean average width of 200 feet. A noticeable and disappointing feature is the apparent depth of the deposit at first sight, the ore extending downward over the steep banks of the creek for a vertical depth of at least 50 feet below the surface of the deposit and nearly to the bed of the creek. As the deposit was not crosscut or worn through by the stream, its deceiving appearance is soon apparent when excavating into the banks. At no place was it found to be more than a foot thick, positively proving that the deposit is of recent origin, and has in its secondary deposition of the limonite simply laid down in conformity to the pre-existing contour of the ground, flowing as a scum in solution down the steep banks and settling in thin, almost vertical layers. The pits sunk on the flat surface of the deposit penetrated the ore at varying depths of from 2 to 5 feet. About one-third of the surface of the deposit is strewn with large angular boulders and smaller talus from the slope of the mountain, which rises steeply from the outer edge of the ore. There are some isolated beds

of limonite exposed on the benches of the creek-valley 4,000 feet distant below the above deposit, but they are negligible in extent, the largest patch containing about 1,000 tons of ore.

Section 4.—The limonite-deposits on Rae creek are a group of three irregular beds pitching at an average incline of 20°, and with the exception of this steep pitch are similar in other respects to altitude and position as the aforementioned deposits, and near the head of the valley of the creek, which is U-shaped and has no outlet at the upper end, being encircled by an unbroken mountain range averaging 1,000 feet above the floor of the valley, which in turn is 1,000 feet higher than the Taseko valley where Rae creek forms a junction with the Taseko river.

Section 5.—In this group there are twelve exposed deposits more or less separated and distributed over a distance of 2 miles between the upper and lower ore-beds in the valley of Iron creek. This stream flows parallel to Rae creek and, like the latter, drains into the Taseko river a mile farther west. The valley is wider than either of those aforementioned and is favoured by some as a route of travel into the Taseko district. A trail over the pass at the head of the valley leads into the Chilcotin plains and branches into alternative routes to Lillooet. The columnar structure of basalt ridges called "Battlement range" runs in a westerly direction on the northerly side of Iron Creek valley, and is apparently the northern boundary of the iron-bearing rocks from which the secondary limonite ores were derived.

On the lower portion of the valley several trenches had some years ago been made in the ore-deposits, which had partly filled in. There were also two pits 6 feet deep, this being the only evidence of any previous prospecting-work having been done. The work in these pits was said to have been abandoned on account of water trouble, and being still in clean ore at 6 feet in depth would indicate a much greater thickness, but further work I had done penetrated the ore-beds in less than a foot of increase in depth.

The appearance of so many closely related exposed beds of limonite ore would, in the absence of proof to the contrary, lead to the belief that the beds have continuity, particularly as some of the intervening ground from the detached ore-bodies is heavily impregnated with iron-rust, and where the moss has been removed in places thin shells of bog-ore are found underneath, but in no place is the amount appreciable enough to be classed as ore, and considerable stripping and prospecting failed to reveal any positive tonnage other than that defined by the boundaries of the exposed ore-beds as here given in tabulation form.

Sections 7 and 8.—These deposits are known as the "McClure Mountain group" and are divided into two sections about a mile apart. They are situated approximately 4 miles east of Taseko lake and 2 miles south of the Taseko river. McClure creek runs through Section 7, the easterly deposit, which has a maximum and minimum altitude of 6,800 and 6,100 feet. The westerly deposit on Section 8 is split into two branches which have a maximum and minimum altitude of 7,000 and 6,200 feet. The upper half of the deposit occurs in a series of steps or gently sloping benches for a length of 3,000 feet, with varying width of from 100 to 250 feet; then gradually tapers down to 50 feet in width, extending in a long narrow pointer for a distance of 1,200 feet, which is here separated from the smaller or lower half of the deposit by a bushy hummock 100 feet across.

The McClure Mountain deposits are the greatest in extent and of chief importance. The limonite ore is characteristically the same as the other deposits here described, having the soft loose layer on the surface and the harder dark platy ore beneath. The exposed deposits are free from boulders and debris. Private interests have developed the ore-beds by assessment-work in a persistent manner for a number of years, and as such work was in progress the writer visited the section with an assistant for the purpose of examining, surveying, and estimating the character and amount of the limonite ore in-place. Finding that, apparently on account of water trouble, as no system of making drainage-cuts had been adopted, most of the pits and trenches had been abandoned at varying depths without penetrating the ore-beds, an attempt was then made to continue the work with the Provincial field working party, but, having to ford the river at high water with tools and camp equipment from other points, very little was accomplished before severe snow-storms made it advisable to discontinue.

The deepest work done on the deposits at the time of my visit was 6 feet; there were many holes dug to depths of 4 and 5 feet, most of which had not bottomed or penetrated the ore-beds. An average depth of 5 feet may be considered as certainly proven, and probably the depth is greater at least in places, but in the absence of proof is not certain.

Section 8.—On the west bank of Warner creek are a number of iron-deposits which are more of the soft, red, earthy variety of bog-ore, not having the heavy dark appearance and laminated structure of all the deposits on the Taseko Valley side of the Warner Pass divide. These deposits are prominently in view from the Gun Creek trail and would appear to be much greater in extent than is the case. The surrounding country-rocks and banks of the creek are heavily stained with iron oxides, which at no great distance give the impression of huge masses of limonite-iron ore. The work done did not prove up any great extent or depth of the several ore-beds.

Analyses of Samples of Limonite.

Description.	Sample No.			
	6315.	6319.	6323.	6325.
Iron (metallic)	47.6	48.8	49.2	50.8
Silica (SiO_2)	5.2	1.6	4.7	2.5
Manganese (Mn)	*Nil.*	*Nil.*	*Nil.*	*Nil.*
Phosphorus (P)	Trace	Trace	Trace	Trace.
Sulphur (S)	0.86	1.34	1.06	1.77
Water (combine)	6.7	7.1	6.0	7.1

Assays of Taseko Valley Limonite Ore.

Sample No.	Section No.	Iron.	Description.
6300	1	46.40	Open-cut on upper deposit.
6301	1	51.70	Gravelly surface ore, No. 2 deposit.
6302	1	44.40	Pit 5 feet deep.
6303	1	49.08	Open-cut under moss, Nos. 2 and 3 deposits.
6304	1	48.06	Upper trenches on No. 3 deposit.
6305	1	49.28	Lower trenches on No. 3 deposit.
6306	1	46.40	Open-cut on No. 4 deposit.
6307	1	46.04	Open-cut under drift.
6308	2	48.00	Feo creek, upper deposit.
6309	2	48.00	Feo creek, lower deposit.
6310	2	58.50	Hæmatite from Feo Creek ridge.
6311	3	50.00	Whale mountain, pit No. 1.
6312	3	46.00	" pit No. 2.
6313	3	47.20	" pit No. 3.
6314	3	51.00	" trench, No. 2 deposit.
6315	3	47.60	" open-cut, No. 2 deposit.
6316	3	44.60	" pit No. 4.
6317	3	44.60	" pit No. 5.
6318	3	46.40	" pit No. 6.
6319	4	48.80	Rae creek, No. 1 deposit.
6320	4	51.60	" No. 2 deposit.
6321	4	51.00	" No. 3 deposit.
6322	5	47.60	Iron creek, distributed samples.
6323	5	49.20	" distributed samples.
6324	6	49.00	McClure mountain, E. section, distributed samples.
6325	7	50.80	McClure mountain, W. section, distributed samples.
6326	8	47.00	Warner Creek deposits, distributed samples.

TONNAGES OF TASEKO LIMONITE ORE.

Section No.	Locality.	Deposit No.	Positive Ore. Area in Sq. Feet.	Depth.	Tons.	Probable Ore. Area in Sq. Feet.	Depth.	Tons.
1	Burton creek	1	$\frac{80,000 \times 2}{16}$	=	10,000	299,000		
1	"	2	$\frac{100,000 \times 3}{16}$	=	18,750	8,000		
1	"	3	$\frac{55,000 \times 1\frac{1}{2}}{16}$	=	5,156	2,000		
1	"	4	$\frac{20,000 \times 1}{16}$	=	1,250	1,000		
					35,156	$\frac{310,000 \times 1}{16}$	=	19,375
2	Whale mountain	1 (lower)	$\frac{100,000 \times 3}{16}$	=	56,250	$\frac{160,000 \times 2}{16}$	=	20,000
2	"	2 (upper)	$\frac{70,000 \times 2}{16}$	=	8,750	$\frac{3,000,000 \times 3}{16}$	=	562,500
					65,000			582,500
3	Feo creek	1 (upper)	$\frac{160,000 \times 3}{16}$	=	30,000			
3	"	2 (lower)	$\frac{20,000 \times 1}{16}$	=	1,250	*Nil.*		
					31,250			
4	Rae creek	1	$\frac{50,000 \times 1\frac{1}{2}}{16}$	=	4,687			
4	"	2	$\frac{30,000 \times 3}{16}$	=	5,625			
4	"	3	$\frac{75,000 \times 3}{16}$	=	14,063	$\frac{60,000 \times 1}{16}$	=	3,750
					24,375			
5	Iron creek	$\frac{1}{2}$	$\frac{267,000 \times 2}{16}$	=	33,375	$\frac{80,000 \times 1}{16}$	=	5,000
6	McClure mountain	E. half	$\frac{1,650,000 \times 5}{16}$	=	78,125	$\frac{900,000 \times 3}{16}$	=	56,250
7	"	W. half	$\frac{1,197,500 \times 5}{16}$	=	374,210	$\frac{3,750,000 \times 3}{16}$	=	234,375
					452,335			290,625
8	Warner creek	1 to 4	$\frac{250,000 \times 2}{16}$	=	31,250	$\frac{16,000 \times 1}{16}$	=	10,000
			Total		672,741	Total		911,250

SUMMARY.

The opinion of many engineers and other authorities regarding the economic importance of the Taseko Valley iron-ore deposits has not been borne out by the exploration and field-work accomplished; it has positively demonstrated that the ore tonnage is insufficient to warrant the installation of the necessary equipment to mine out the ore-beds under the existing conditions.

The unfavourable features are: These deposits are not continuous in one consolidated block, but consist of a number of widely scattered aggregates; the comparatively shallow depths of the ore-beds, and the fact that these are not, as a casual appearance would indicate, continuous over greater distances underlying the light moss covering the floors of the valleys. Given a much greater tonnage of ore, some very favourable features obtain, such as the high average value of the ore and the even tenor of its iron content. It contains no excess of impurities that would influence the character of furnace pig-iron. The ore is easily broken down and suited to cheap mining, but with the present distance from transportation there is not sufficient quantity to class the district as an important source for future iron-ore supply.

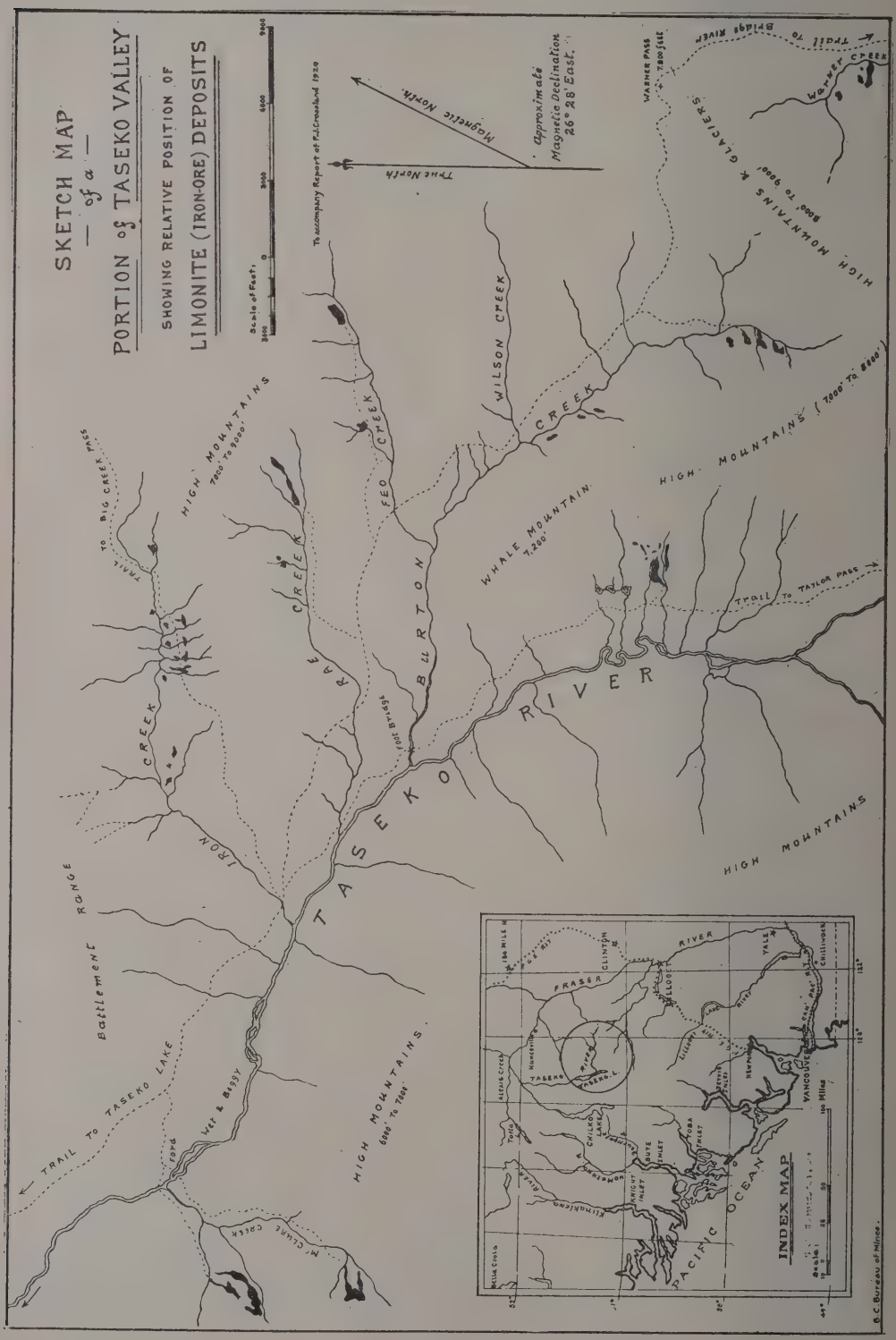
In conclusion, I would like to add that many other similar deposits of limonite occur in adjacent localities to the north and west. It is reported on good authority that beds of this character of iron-ore exist approximately 20 miles distant on the west side of the Taseko lake, and there are known to be a number of deposits in the valley of the Big creek and its tributaries, but owing to the lateness of the season it was not possible to explore these other localities, and in the absence of definite information I am not able to report as to their character and extent.

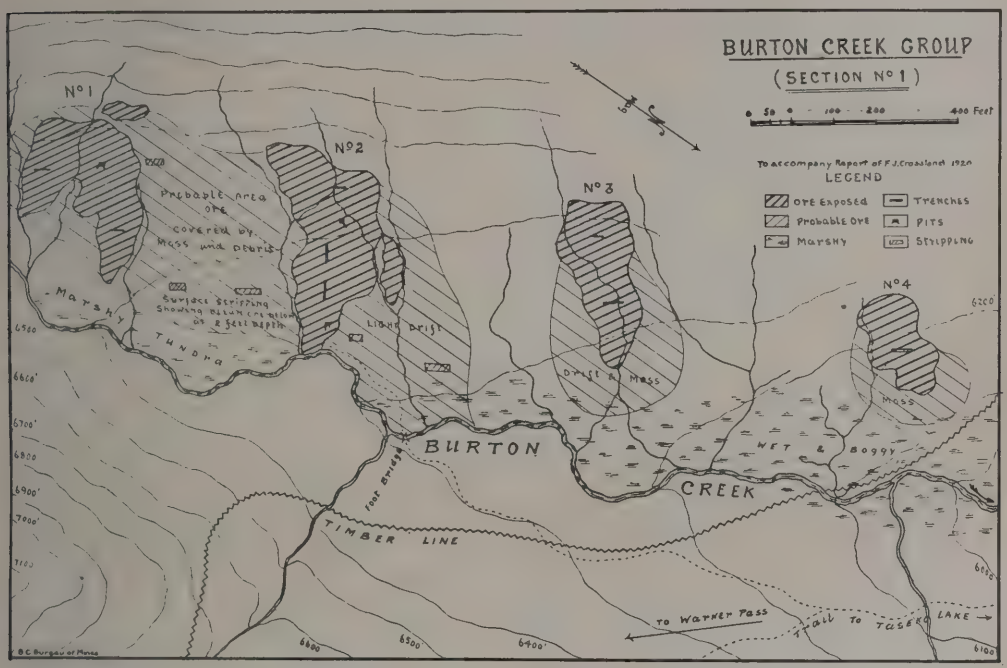
Should any of the points I have laid down in this report not be quite clear, I will be pleased to explain and give any other information within my knowledge.

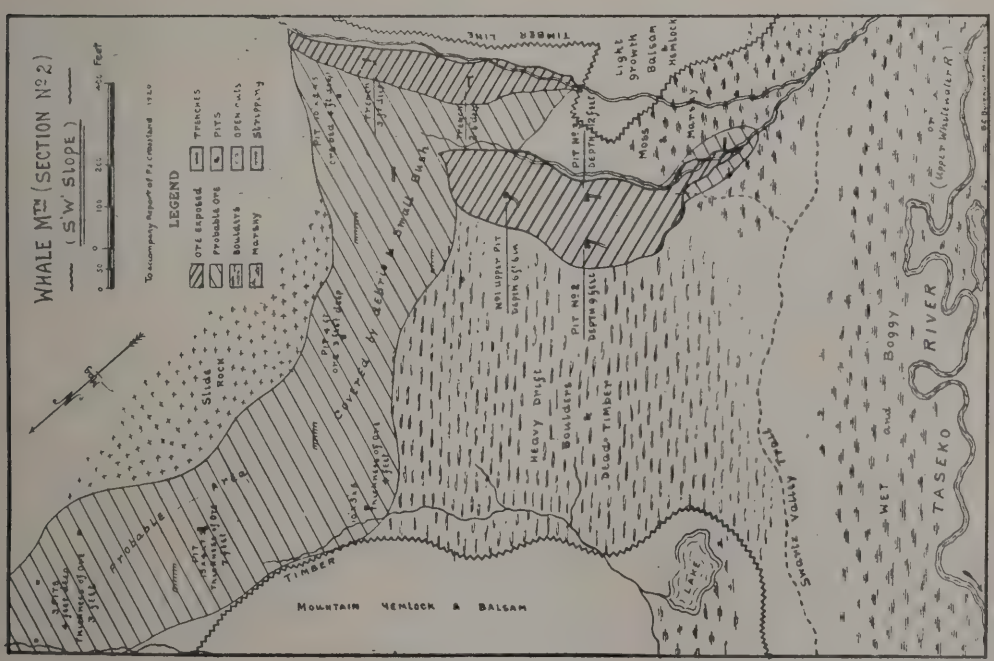
I have, etc.,

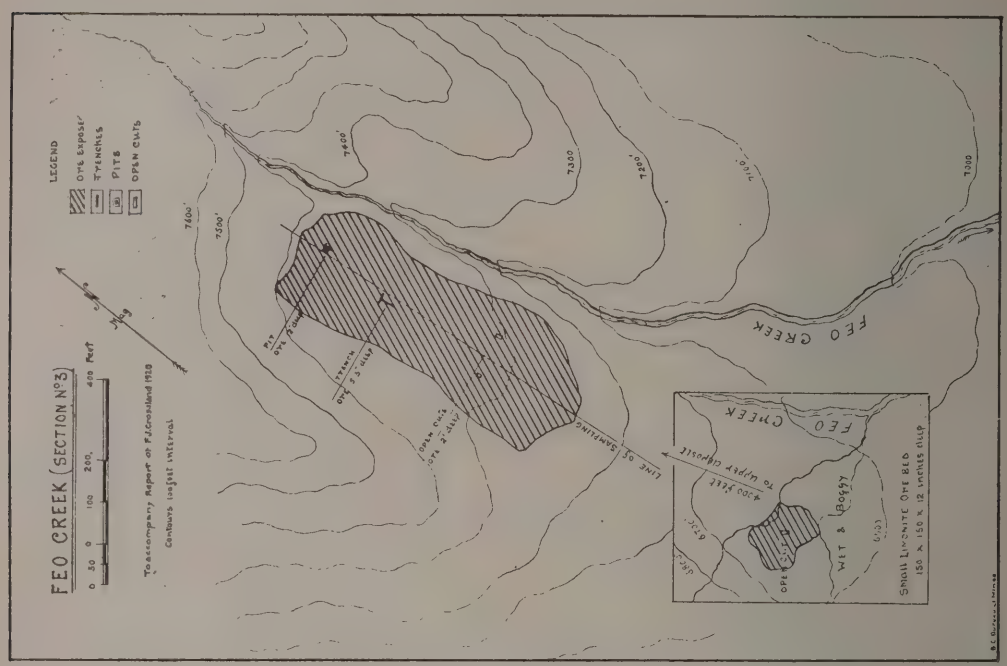
F. J. Crossland,

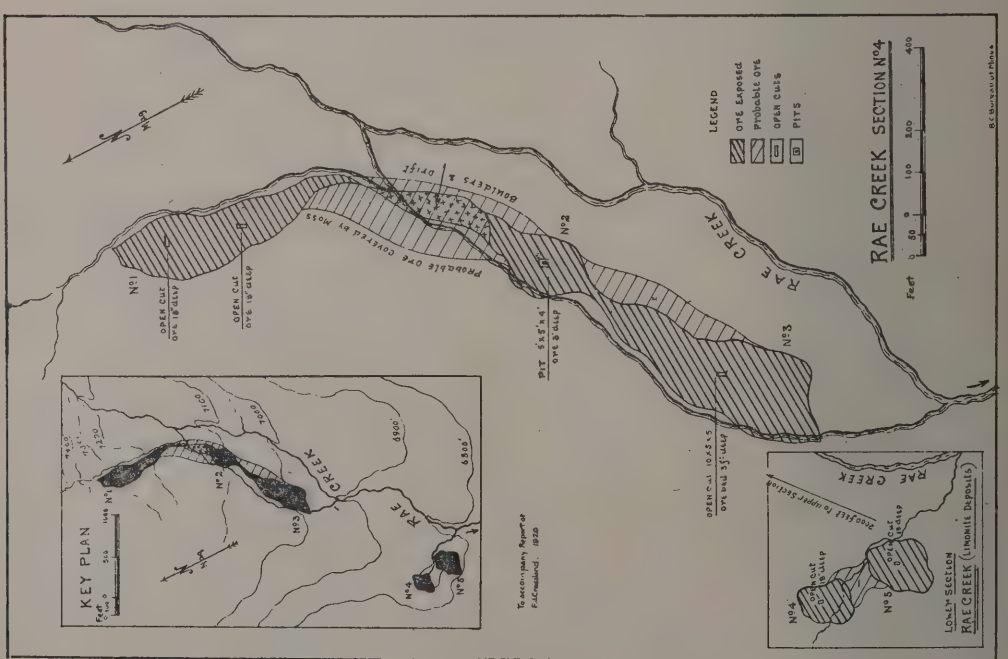
Mining Engineer and Geologist.

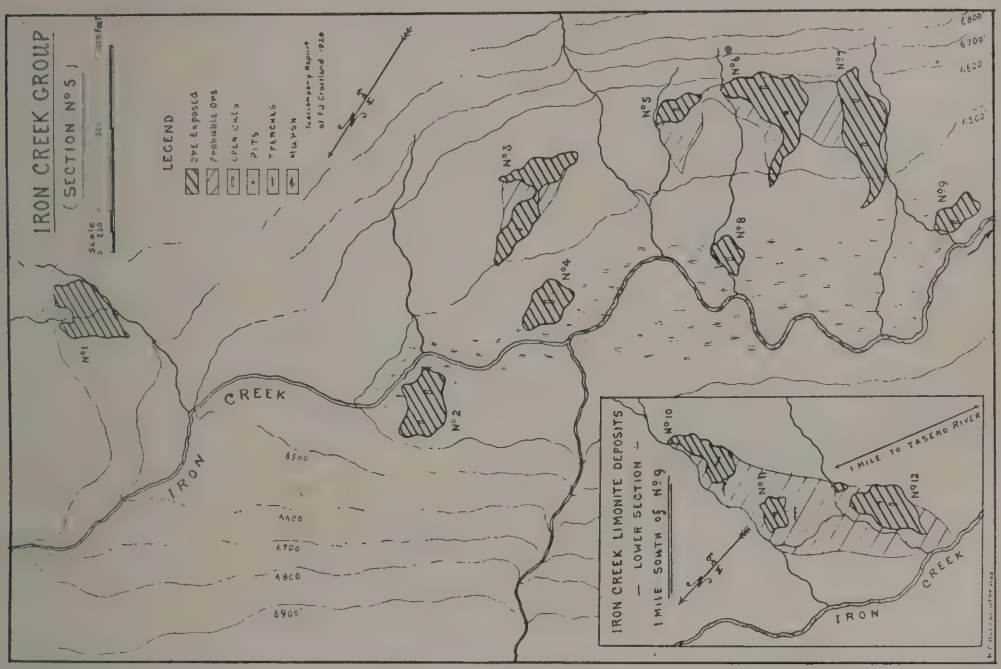

SKETCH MAP
— of a —
PORTION of TASEKO VALLEY
SHOWING RELATIVE POSITION OF
LIMONITE (IRON-ORE) DEPOSITS
Scale of Feet
Magnetic North
Approximate Magnetic Declination 26° 28' East.
To accompany Report of F.J. Crowhurst 1920
TASEKO RIVER
WILSON CREEK
BURTON
FEO CREEK
RAE CREEK
IRON CREEK
WHALE MOUNTAIN 7,250'
HIGH MOUNTAINS 7000' TO 9000'
HIGH MOUNTAINS 6000' TO 7500'
HIGH MOUNTAINS
HIGH MOUNTAINS (7000' TO 8000')
HIGH MOUNTAINS 8000' TO 9000'
WARNER PASS 7800 FEET
WARNER CREEK
TRAIL TO Bridge RIVER
TRAIL TO BIG CREEK PASS
TRAIL TO TASEKO LAKE
TRAIL TO TAYLOR PASS
Battlement RANGE
Wet & Boggy
Forks
McCLURE CREEK
INDEX MAP
PACIFIC OCEAN
FRASER RIVER
YALE
CHILLIWACK
VANCOUVER
TASEKO
B.C. Bureau of Mines.

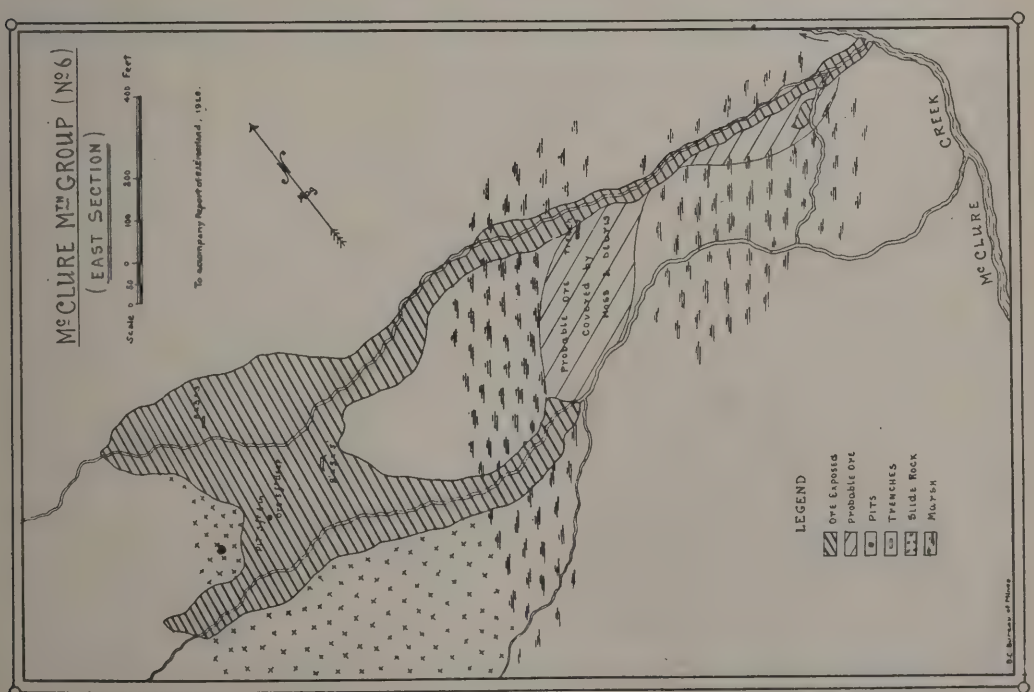

BURTON CREEK GROUP
(SECTION Nº 1)
50 100 200 400 Feet
To accompany Report of F.J. Crossland 1920
LEGEND
Ore Exposed
Probable Ore
Marshy
Trenches
Pits
Stripping
Nº1
Nº2
Nº3
Nº4
Probable area ore covered by moss and debris
Surface stripping showing dikes (?) and ore & rock bands
Marshy
Thin Drift
Light Drift
Drift & Moss
Moss
Wet & Boggy
BURTON CREEK
TIMBER LINE
To Warner Pass
Trail to TASEKO LAKE
B.C. Bureau of Mines

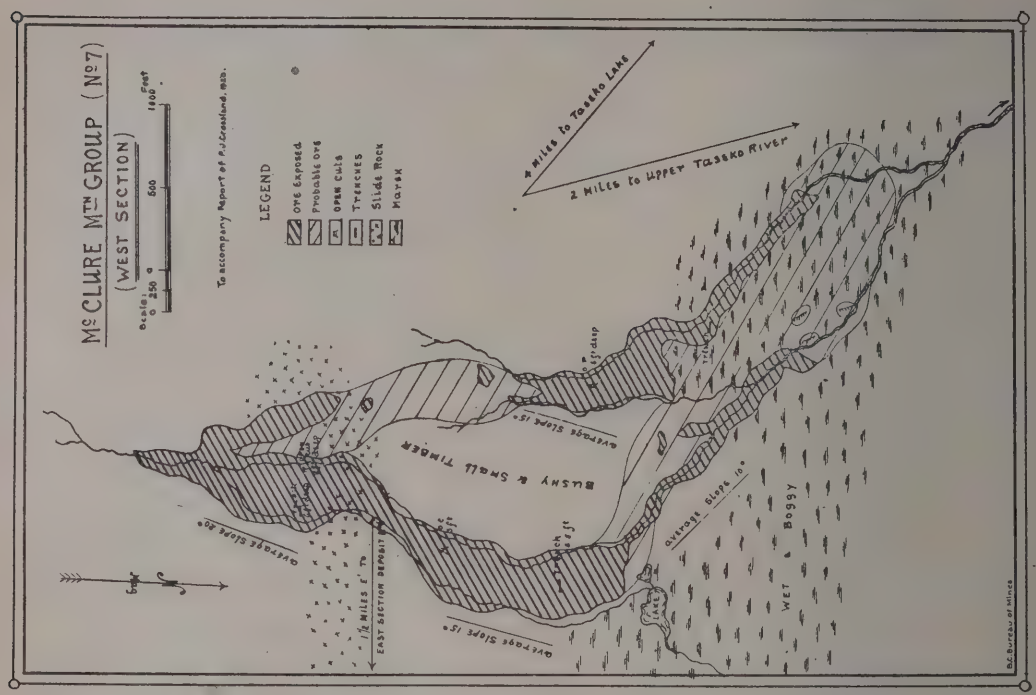

WHALE Mtn (SECTION Nº 2)
(S.W. SLOPE)
To accompany Report of F.J. Crossland 1920
LEGEND
Ore Exposed
Probable Ore
Boulders
Marshy
Trenches
Pits
Open cuts
Stripping
TIMBER LINE
Light growth Balsam & Hemlock
Moss
Marsh
Pit Nº1 Depth 15 feet
Pit Nº2 Depth 9 feet
Heavy Drift
Boulders
Dead Timber
Slide Rock
Probable
Mountain Hemlock & Balsam
Wet and Boggy
TASEKO RIVER
(Upper Washwater R.)

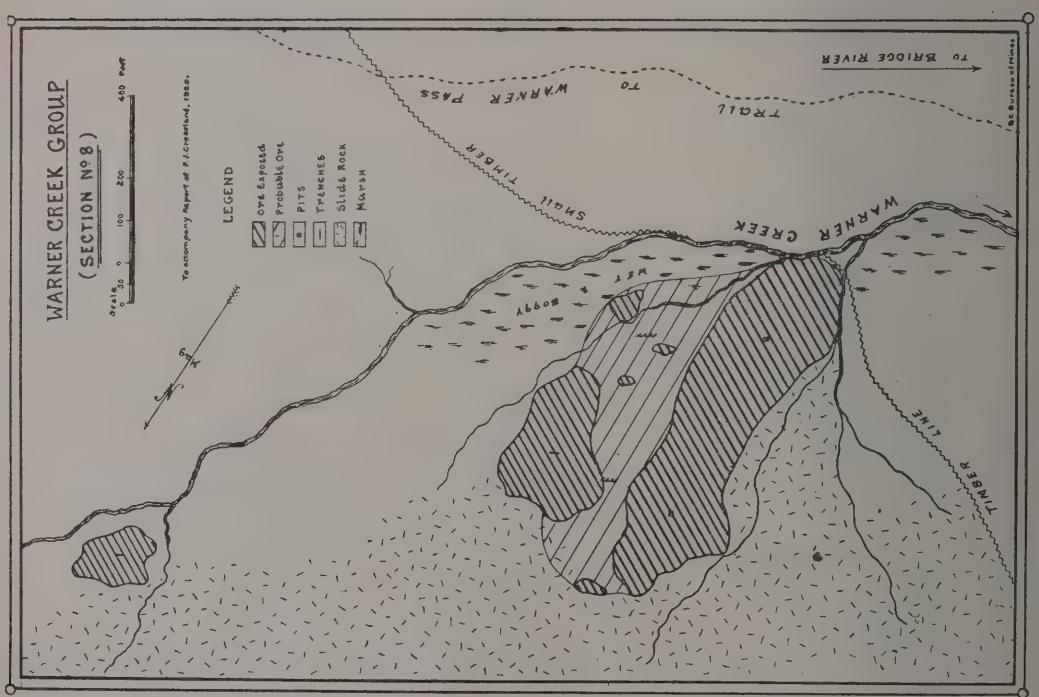

FEO CREEK (SECTION N°3)
LEGEND
Ore Exposed
Trenches
Pits
Open Cuts
Feet
Topography Reported on by Queensland 1920
Contours 100 feet interval
FEO CREEK
7600'
7500'
7400'
7300'
7200'
LINE OF SECTION
Pit
Ore Exposed
Trench
Ore Exposed
Open Cuts
Ore Exposed
FEO CREEK
400 feet
to upper outcrop
WET & BOGGY
SMALL LIMONITE ORE BED
150 x 150 x 12 inches deep


RAE CREEK SECTION N°4
LEGEND
Ore Exposed
Probable Ore
Open Cuts
Pits
Feet
N°1
OPEN CUT
ORE 18' DEEP
OPEN CUT
ORE 18' DEEP
Probable Ore Covered by Moss
Boulders & Drift
N°2
PIT SAID TO BE
ORE 9' DEEP
RAE CREEK
N°3
OPEN CUT 10 FEET
ORE 35' DEEP
KEY PLAN
RAE CREEK
6900'
6800'
N°1
N°2
N°3
N°4
N°5
Topography Reported on by Queensland 1920
RAE CREEK
400 feet to upper Section
N°4
OPEN CUT
ORE 6' DEEP
N°5
OPEN CUT
ORE 6' DEEP
LOWER SECTION
RAE CREEK (LIMONITE DEPOSITS)


IRON CREEK GROUP
(SECTION N°5)
LEGEND
Ore Exposed
Probable Ore
Open Cuts
Pits
Trenches
Muskeg
Topography Report of Fig Creekland 1926
N°1
N°2
N°3
N°4
N°5
N°6
N°7
N°8
N°9
IRON CREEK
6500
6600
6700
6800
6900
IRON CREEK LIMONITE DEPOSITS
— LOWER SECTION —
1 MILE SOUTH OF N°9
N°10
N°11
N°12
1 MILE TO FRASER RIVER
IRON CREEK


McCLURE Mtn GROUP (N°6)
(EAST SECTION)
To accompany Report of Fig Creekland, 1926.
LEGEND
Ore Exposed
Probable Ore
Pits
Trenches
Slide Rock
Muskeg
McCLURE CREEK


McCLURE Mtn GROUP (No 7)
(WEST SECTION)
Scale: 0 250 500 1000 Feet
To accompany Report of P.J. Crossland, 1920.
LEGEND
Ore Exposed
Probable Ore
Open Cuts
Trenches
Slide Rock
Marsh
4 Miles to Taseko Lake
2 Miles to Upper Taseko River
Bushy & Small Timber
Overage Slope 15°
Overage Slope 30°
Overage Slope 10°
Wet & Boggy
Lake
East Section Deposit
B.C. Bureau of Mines


WARNER CREEK GROUP
(SECTION No 8)
Scale: 0 100 200 400 Feet
To accompany Report of P.J. Crossland, 1920.
LEGEND
Ore Exposed
Probable Ore
Pits
Trenches
Slide Rock
Marsh
To Bridge River
Trail To Warner Pass
Small Timber
Warner Creek
Timber Line
B.C. Bureau of Mines

YALE DISTRICT.

NICOLA MINING DIVISION.

REPORT BY J. A. MURCHISON, MINING RECORDER.

I have the honour to submit herewith the annual report and office statistics of the Nicola Mining Division for the year ending December 31st, 1920.

Owing to the unfavourable economic conditions no progress has been made in mining in this district during the year 1920.

OFFICE STATISTICS—NICOLA MINING DIVISION.

Locations recorded	111
Free miners' certificates	144
Certificates of work	155
Bills of sale	18

VERNON MINING DIVISION.

REPORT BY L. NORRIS, GOLD COMMISSIONER.

During the year 1920 there was little activity in mining circles. Several placer leases were staked on Whiteman's creek and several on Cherry creek. In each case considerable preliminary development-work was done, but no returns to date. There have been no new discoveries of any importance.

OFFICE STATISTICS—VERNON MINING DIVISION.

Free miners' certificates	146
Mineral claims recorded	106
Placer claims	35
Certificates of work	14
Placer leases	14
Transfers	3
Crown grants	2

YALE MINING DIVISION.

REPORT BY H. BEECH, MINING RECORDER.

I have the honour to submit the annual mining report and office statistics for the year ending December 31st, 1920.

PLACER-MINING.

Parties claiming to have improved machinery for the treatment of placer-ground have filed applications on ground near Yale.

LODE-MINING.

Development-work has proceeded steadily on most of the claims in the Yale Mining Division.

The Emancipation Mining Company has bonded its claims to the Liberator Mining Company. The latter company at once put in a compressor plant and has been driving the main and lower tunnels. High-grade ore has been opened up in the main tunnel and a body of milling-ore in the lower tunnel. A railway siding is to be put in to connect with the Kettle Valley Railway.

Reports of other properties having been bonded have been made and the new year should show great developments in this district.

OFFICE STATISTICS—YALE MINING DIVISION.

Free miners' certificates issued	148
Mineral claims recorded	143
Certificates of work	164
Bills of sale	29

ASHCROFT MINING DIVISION.

REPORT BY J. S. ALEXANDER, MINING RECORDER.

I have the honour to submit my annual report as Mining Recorder for the Ashcroft Mining Division for the year 1920.

I understand considerable work has been done on the *O.K.* group and the *Snowstorm* group, situated in Highland valley. The annual assessment-work has been done on the majority of all the old claims.

The Resident Mining Engineer is, I understand, making a comprehensive report on mining conditions in this Division.

OFFICE STATISTICS—ASHCROFT MINING DIVISION.

Mineral claims recorded	93
Certificates of work issued	97
Bills of sale, etc.	15
Free miners' certificates issued	58

KAMLOOPS MINING DIVISION.

REPORT BY E. FISHER, GOLD COMMISSIONER.

I have the honour to submit my annual report for the Kamloops Mining Division for the year ending December 31st, 1920.

Active quartz-mining has been practically at a standstill during the past year in this district. The *Iron Mask* mine, the principal producer, suspended operations early in the year, but a force of men has been kept at work doing general repairs, overhauling of plant, and putting in plant and works for the pumping of water direct from the Thompson river to the mine.

The Queen Bess Company ceased operations on its properties at Black Pool and confined its activities to the development of coal properties at Chu Chua, on which an option is held. Good progress has been made and the production greatly increased; the coal now being produced is clean and of excellent quality. The demands of the local market and the proximity of the mine to the Canadian National Railway for shipping purposes should make this enterprise a big asset to the district.

The number of new claims recorded shows a considerable falling-off from the previous year, but assessment-work has been well kept up.

The only placer-mining done has been on 3-Mile creek, but owing to the late high water not much work was possible, but what was done gave promising results. Several parties representing outside capital have been looking over the ground, and as a result several bench leases have been taken up, and should the prospecting-work at present being carried out on these leases prove satisfactory, it is the intention to install up-to-date machinery to work the ground.

OFFICE STATISTICS—KAMLOOPS MINING DIVISION.

Free miners' certificates	450
Mineral claims recorded	134
Placer claims recorded	11
Placer leases	5
Certificates of work issued	194
Bills of sale	57
Mining receipts	$3,919.45

WESTERN DISTRICT (No. 6).

Report by Wm. M. Brewer, Resident Engineer.

INTRODUCTION.

The Western Mineral Survey District (No. 6) includes the seven most westerly Mining Divisions in the Province. These are Alberni, Clayoquot, Quatsino, Victoria, and Nanaimo on Vancouver and adjacent islands, and New Westminster and Vancouver on the Mainland.

During the past year the field-work as outlined by the writer at the beginning of the year as desirable to be accomplished was curtailed for several reasons beyond his control, and especially on account of the heavy rainfall in September, October, and November, which caused so much high water in rivers and creeks, that are usually easily crossed on foot-logs or fordable, as to make crossings impossible and therefore impede travelling on foot. About twenty-five groups of mineral claims were examined during the past season, which necessitated trips along the west coast of Vancouver island; to Buttle lake, in Strathcona Park, near the centre of Vancouver island; to Jordan river and East Sooke, Victoria Mining Division; to Texada island; to Lasqueti island; to the headwaters of Phillips river, on the divide between that river and Bute inlet, on the Mainland; as well as to Thurlow island, Phillips and Frederick arms, Jervis inlet, Howe sound, and Seymour creek.

AID TO RETURNED SOLDIERS IN PROSPECTING.

During the months of May and June considerable time was occupied in carrying out the regulations in relation to the policy of the Minister of Mines with regard to aiding returned soldiers in prospecting. It was arranged that twenty-five parties of two returned men in each—one to be an experienced prospector, the other an inexperienced man—should be selected, grub-staked, and assisted to prospect in such section of the Province as each party desired during the season of 1920. As the number of men to be sent out was apportioned to each of the six Mineral Survey Districts in proportion to the population of the various districts, and as District No. 6 contains about 70 per cent. of the population of the Province, it fell to the lot of the writer to select fifteen parties of two men in each out of the twenty-five parties, the total number provided for.

As this selection had to be made from over 100 applications, considerable correspondence and many interviews were necessary before the parties were finally dispatched to the several sections of the Province in which they desired to prospect.

Only eight men or four parties of those selected desired to prospect in District No. 6, the remainder choosing other districts. Of those parties which favoured District No. 6, two parties went on to the west coast of Vancouver island; one to the mountains in the vicinity of Jervis inlet, on the Mainland; and the other to the Tyzoone river, which flows into the Narrows arm of Seechelt inlet, also on the Mainland. The results so far as locating mineral claims are concerned may be considered as being only fairly satisfactory, while the results from the standpoint of valuable information brought back by the respective parties relative to the fields in which prospecting was done are considered as being quite sufficient to justify the policy pursued by the Government.

The two parties that went to the west coast of Vancouver island located two mineral claims on Kokshittle arm of Kyuquot sound, and the party that went up Jervis inlet also staked two mineral claims near Mount Diadem, but the fourth party did not locate any mineral claims.

The parties on the west coast of Vancouver island were visited about the middle of August, when it was learned by the writer that the coast in the vicinity of Nasparti and Ououkinsh inlets, southerly of Cape Cook, had been quite thoroughly prospected by them, and that the remainder of the season would be devoted to prospecting in the mountains bordering on Kokshittle arm of Kyuquot sound.

An attempt was made in September to visit the parties who were prospecting on the Mainland, but this was abandoned after the writer reached Jervis inlet in a gasolene-launch,

partly on account of the south-easterly storms that were prevailing and lack of sheltered anchorages in the inlet, and also for the reason that the men were reported as being back in the mountains some 4 or 5 miles and the location of their camps was unknown to the residents at Egmont Point Post-office, where the prospectors had been receiving mail and obtaining supplies.

The parties who went to the west coast of Vancouver island returned to Victoria on October 9th, and those who went to Jervis and Seechelt inlets returned to Vancouver about October 1st. From the reports brought in, as well as from other information, the writer was satisfied that all of the men had carried out their contracts in a satisfactory manner, and consequently paid them off according to the agreement entered into when they started.

For convenience in the following report it is deemed advisable to divide each Mining Division into sections and subsections. These Divisions are as follows:—

Name of Mining Division.	Section.	Subsection.
Alberni	Alberni Canal.	
	Barkley Sound	Uchucklesit Harbour.
		Copper Island.
		Henderson Lake.
	Great Central Lake.	
Clayoquot	Tofino Inlet	Kennedy Lake.
		Deer Creek.
	Central West Coast	Bedwell Sound.
		Ahousat.
		Sidney Inlet.
		Nootka Sound.
Quatsino	South-east Arm	Elk Lake.
		South-east Arm.
	West Arm.	
	Kyuquot Sound	Kokshittle Arm.
Nanaimo	Strathcona Park	Buttle Lake.
		Quinsam Lake.
	Salmon River.	
	Quadra Island.	
	Phillips Arm.	
	Texada Island.	
	Redonda Island.	
	Comox.	
	Cumberland.	
	Nanaimo	Cassidy.
		Nanoose.
	Tatlayoko Lake.	
	Lasqueti Island.	
Vancouver	Britannia Belt.	
	Lynn Creek.	
	P.G.E. Railway	Alta Lake.
		Cheakamus Lake.
		Stawamus River.
	Jervis Inlet.	
New Westminster	Cheam Range.	
	Agassiz.	
	Stave River.	
	Harrison Lake.	
Victoria	East Sooke.	
	Jordan River.	
	Saltspring Island.	
	Cowichan Lake.	
	Koksilah River.	

As an introduction to this, the fourth annual report on the Western District No. 6, it may be mentioned that, although there have been no very outstanding events or phenomenal conditions to record in connection with the mining industry during 1920, very considerable progress has been made in development-work, especially on mineral claims on Vancouver island, where a total amount approximating $500,000 has been spent with satisfactory results.

The writer desires to express his appreciation for the many courtesies, assistance, and general all-round good-fellowship he has experienced from each and every man connected with

the mining industry in District No. 6 with whom he has come in contact. As it is impossible to make a personal acknowledgment for the kindness he has universally received, he desires that this expression may be accepted in lieu of such.

It is gratifying to be able to report that the relations between capital and labour in District No. 6 in all branches of the mining industry have been quite cordial, harmonious, and satisfactory, and that all the indications at the close of 1920 point to a continuance of such desirable conditions.

BIBLIOGRAPHY.

In the Annual Report for 1917 a full bibliography pertaining to the Western Mineral District, published previously to that date, appeared on pages 239–241, so that it is not necessary to repeat in the present report, but only to add the publications that have been published since then, which are as follows:—

Summary Report, Geological Survey, Canada, 1917, Part B. Reconnaissance along the Pacific Great Eastern Railway between Squamish and Lilliooet; also Indian River Copper Deposits, Vancouver Mining Division.

Stansfield, Alfred, D.Sc., A.R.S.M., F.R.S.C. The Commercial Feasibility of the Electric Smelting of Iron Ores in B.C. British Columbia Department of Mines, Bull. No. 2, 1919.

Annual Reports, Minister of Mines, for years ending December 31st, 1918 and 1919.

Cooke, H. C. Gabbros of East Sooke and Rocky Point. Canada Department of Mines, Museum Bull. No. 30, November 15th, 1919.

Daniels, Joseph, Associate Professor of Mining, Engineering, and Metallurgy. The Coking Industry of the Pacific Northwest. University of Washington, Engineering Experiment Station Series, Bull. No. 9.

Summary Report, Geological Survey, Canada, 1918, Part B. Britannia Map Area (S. J. Scofield); also Quatsino Sound and Certain Mineral Deposits of the West Coast of Vancouver Island, B.C. (V. Dolmage).

Summary Report, Geological Survey, Canada, 1919, Part B. Barkley Sound, Vancouver Island, B.C. (V. Dolmage); also Sunloch Copper District, B.C. (V. Dolmage).

METALLIFEROUS MINING.

It is to be regretted that owing to the fall in the price of copper last November the Britannia Mining and Smelting Company, operating in the Vancouver Mining Division, considered that the most advisable course to pursue was to discontinue production temporarily; consequently the concentrating-mill at Britannia Beach, Howe sound, as well as the electric railway and incline tramway, were closed down. The company reduced the pay-roll to about 40 per cent. of its total under normal conditions and operations at present are confined to development-work only in the mine. As this company's mine was the only regular producer of metalliferous ore in the Western Mineral Survey District during 1920, the results, until production is resumed, are serious, especially when the fact is considered that the tonnage of ore mined under normal conditions is about 2,500 tons each day and the number of employees on the pay-roll is about 1,000.

The wage schedule paid by the company when the reduction in the force went into effect was practically the same as when copper was selling at more than 20 cents a pound on the New York market. The fall in November brought the price down to about 14 cents a pound, with comparatively no demand for the metal.

On the other hand, it is gratifying to record that the Tidewater Copper Company, Limited, operating on Sidney inlet, west coast of Vancouver island, made its first shipment of concentrates in December, 1920, from the *Indian Chief* copper-mine since the completion of the reconstruction of the concentrating-mill and the substitution of electric power in place of steam.

During 1920 there occurred some notable changes in the personnel of the management in several of the metalliferous mines in No. 6 District.

J. W. D. Moodie, who has since 1911 occupied the position of general manager of the Britannia Mining and Smelting Company, resigned, and E. J. Donohue was promoted from the position of secretary-treasurer, which he had held for several years, to that of general manager.

H. B. Price, who came from Guatemala in the spring of 1918 to manage the Tidewater Copper Company, Limited, resigned as general manager in the autumn of 1920 to return to the

position of general manager of a gold-mine in Abangarez, Central America, and S. P. Silverman was appointed general manager, with D. M. Drumheller, Jr., general superintendent.

John Hanna, who has acted as superintendent of the *Sunloch* mine on Jordan river since development was first started in the spring of 1917, resigned the latter end of May last, and G. H. Kilbourne was transferred from the management of the *Sullivan* mine, in the Fort Steele Mining Division, to the same position with the Sunloch Mines, Limited, the controlling interest in which has been purchased by the Consolidated Mining and Smelting Company of Canada.

A. S. Williamson, who has superintended the prospecting and development work on the *Lucky Four* group of mineral claims in the Cheam range of mountains, resigned that position for the management of the development-work on the old *Eureka* silver-mine, in the Yale Mining Division.

It is to be regretted that for the first time since 1898 the *Marble Bay* mine on Texada island has failed to ship any ore. The operations of the Tacoma Steel Company, which owns the mine, have this year been confined to diamond-drilling on and below the 1,700-foot level.

The production from the metalliferous mines in District No. 6 has consequently been confined to that from the *Britannia* mine, except as to one shipment of about 400 tons of concentrates from the *Indian Chief* mine of the Tidewater Copper Company, Limited. Early in 1920 it was reported that concentrating-mills would be built by the Consolidated Mining and Smelting Company to treat the copper ores of the *Old Sport* mine, in Quatsino Mining Division, and the *Sunloch* mine, in the Victoria Mining Division, but work on the construction of these plants has been suspended on account of the extreme high cost of labour and material, in addition to the refusal of manufacturers to guarantee delivery of machinery on a time contract.

It was also reported last spring by reliable authority that the Ladysmith Smelting Corporation, Limited, might possibly reconstruct the old Tyee smelter at Ladysmith and blow it in, but that desirable event has failed to materialize and any ore mined in the Southern Coast District must still be shipped to the Tacoma smelter for treatment.

IRON AND STEEL.

There has been considerable talk and many rumours relative to the establishment of the iron and steel industry on the Coast, but beyond the organization of three new companies there has been but little headway made during 1920. The three new companies are known as the Coast Range Iron and Steel Company; the Shipton Electric Pig Iron and Steel Smelting Company, Limited; and the British Columbia Iron and Steel Works, Limited.

One group of British capitalists evinced such serious interest in the iron and steel industry in British Columbia that Walter D. Rock, an eminent engineer, had been sent out from England twice since October, 1919, to investigate and report on the feasibility of establishing a blast-furnace plant and rolling mills on the Coast. Unfortunately, during his second trip last autumn Mr. Rock died suddenly in Vancouver. It is gratifying to be able to state that his work will be carried on by a successor who is expected to arrive in the near future.

Experiments were made in Vancouver during the past year by J. D. Shipton, who constructed a small electric pig-iron furnace in which he smelted magnetite ore from the *Lake* mine on Texada island and produced a good grade of pig-iron, thereby further demonstrating the fact that the magnetite ores which occur in British Columbia are readily amenable to treatment by electric smelting.

The "Iron-ore Supply Act" passed in 1919 remained in force during 1920, and the writer was authorized by the Honourable the Minister of Mines to continue to administer it. Under this authority ore for experimental purposes was supplied to J. D. Shipton, of the Shipton Electric Pig Iron and Steel Smelting Company, Limited, of Vancouver. In July last a shipment of magnetite was made to Walter E. Agnew, of Los Angeles, California, for experimental purposes in an electric furnace of new design. In December last a supply of magnetite was furnished Dean Milnor Roberts, of the College of Mines, University of Washington, Seattle, for experimental purposes by the United States Bureau of Mines and the University of Washington.

PROSPECTING.

Prospectors have been rather more numerous in District No. 6 during 1920 than has been the case for some years past, but although interest in prospecting appears to be reviving, yet it

SIONAL
ARCH

MINERAL CLAIMS ON JORDAN RIVER

VICTORIA M.D.

To accompany Report of
W.M.Brewer, Resident Engineer, 1920.

Scale:
Feet: 0 500 1000 1500 2000 3000

Note: Sunloch properties within heavy border.

L 859 VIKING 2
L 860 VIKING 3
L 858 VIKING 1 48.31
L 861 VIKING 4 Fr. 51.15
L 853 HOPE
L 841 BLACK BARE
L 840 WHITE BARE
L 839 SOMBRIO
L 843 KING
L 844 ADA Fr.
L 794 SUNLOCH 3
L 795 SUNLOCH 4
L 842 OLIVE 48.44
OLIVE Fr. 51.46
L 793 SUNLOCH 2 50.97
L 792 SUNLOCH 1 51.34
LUCKY BUNCH L 257
L 852 MUD WASP 35.12
L 831 QUEEN BEE 35.99
L 857 BEE Fr. 43.72
L 824 VULCAN 6
L 796 SUNLOCH 5 30.89
L 846 COUR DE LINE 47.7
L 836 HORNET
L 823 VULCAN 5 16.9
L 797 SUNLOCH 2 32.54
L 258 L 485 ROSSLAND 46.89
L 829 ADALINE 51.65
L 827 YELLOWJACKET 41.91
L 829 VULCAN 1 38.28
L 322 VULCAN 4 21.49
L 825 GABBRO 38.18
Reservoir
L 847 MORNING 45.24
L 848 NOONDAY 30.3
L 260
T.L. L.54
L 828 BLACK HORNET 44.62
L 830 WAR EAGLE 51.45
VULCAN 2
Tramway
TIGER
VULCAN Fr.
L 821 VULCAN 3 51.65
L 849 LEROY 40.22
L 850 NELSON 51.61
L 851 TRAIL 51.53
L 857 DODY Fr. 4.28
L 856 AYAH Fr. 46.79
L 855 PEGGY 51.65
L 862 31.86
L 865 GAMMA 51.65
WHITE ROCK
L 863 ALPHA 51.65
L 864 BETA 51.65
Mine
Sunloch Road
Road
Power Co's Pipeline
Vancouver Island Power Co's Transmission Line
Jordan River
L 4
L 3
L 7
L 2
L 9
L 71
L 72
L 8
V.I.P. Co. Power House
Road to Victoria

B.C. Bureau of Mines.

does not begin to reach the point attained in this district about twenty years ago. The system adopted by the Government of aiding returned soldiers in prospecting is responsible in part for the revived interest being taken.

Reports brought in by the prospectors, other than returned soldiers, who returned to Vancouver and Victoria to pass the winter, prove that most of the men are extending their explorations farther back into the mountains bordering the mainland coast than in the past, and are realizing the importance of prospecting thoroughly and systematically the contacts along the easterly side of the Coast Range granitic batholith, as well as searching the belts of metamorphosed sedimentary and igneous rocks which form inclusions in the main batholith. Examples of the occurrence of such inclusions are reported from the Tyzoone River section, which flows into the head of Narrows arm of Seechelt inlet, where Ben Coates with four assistants has located about seventy claims as agents for a number of free miners, residents of Vancouver. Near Mount Diadem, in a northerly direction from the head of Hotham sound, Jervis inlet, Tom Lillie, of Pender Harbour, and partners have been working for the past two years, and in the vicinity of Mount Elsmere, on the west side of Howe sound, M. Johanson and partners have been prospecting for some years. Near the head of Seymour creek, near Loch Lomond, Roy D. Watson and Thomas Fry, of Vancouver, have prospected for some years.

Prospecting in the interior of Vancouver island has been popular during 1920, especially in the vicinity of the westerly slope of Big Interior mountain at the head of Bedwell (Bear) river, where J. B. Woodworth and associates have located the *You* group of mineral claims; also at the head of Buttle lake in Strathcona Park. On the west coast of Vancouver island the most popular sections for prospectors in 1920, in addition to the parties of returned soldiers, have been Jordan river, the Tahsis canal, Nootka sound, Kokshittle arm, Tofino creek at the head of Tofino inlet, and Elk river, which flows into Kennedy lake. The number of prospectors along the west coast has not been great, but the men engaged in that pursuit were all thoroughly experienced, and for that reason it is expected that during the coming year it will be found the locations made have commercial value.

While discussing prospecting it may be advisable to refer to some of the most promising sections in District No. 6 in which the geologic conditions are apparently favourable for the occurrence of ore-bodies. On the Mainland there is the northerly part of Nanaimo Mining Division which can be approached by water from Toba, Bute, Loughborough, Knight, Drury, and Seymour inlets. This section has received but little attention from prospectors for several years past, when such properties as the *Dorotha Morton* and *Douglas Pine* were being operated, and at that time the attention of prospectors appears to have been confined to the vicinity of the shore-lines.

Quadra island is another section deserving of more thorough prospecting than it has received, also the southerly part of Texada island.

The interior of Vancouver island is gradually becoming more accessible through the construction of railways and therefore should present an attractiveness it has not done heretofore. The Great Central and Sproat lakes will in the near future be connected with the Port Alberni branch of the Esquimalt & Nanaimo Railway, which will make the mountainous sections beyond the heads of these lakes more accessible than heretofore. The mountain ranges bordering on Sooke, Shawnigan, Cowichan, and Nitinat lakes are to-day within easy access of the Canadian National Railway. This fact has already been mainly responsible for the development of the talc-deposits on Wolf creek, a tributary of Sooke river.

ALBERNI MINING DIVISION.

Considering the large number of mineral claims in good standing in the Alberni Mining Division, it is with regret that it is necessary to report that there has been but little activity in the mining industry in the Division during 1920. At the time the Annual Report for 1919 was written it appeared as though there would be serious development-work carried on during the 1920 season at least on the *Big I.* and *Monitor* groups of mineral claims, but such has not been the case.

With regard to the *Big I.* group of mineral claims near the head of Great Central lake, on which the Consolidated Mining and Smelting Company took a bond in the autumn of 1919, the Company did send during the summer a force of mining engineers on to the property to make geological and topographical surveys and to systematically sample the extensive outcroppings.

About the time this work was completed some complications with regard to the title to two of the claims of the group of four mineral claims arose, and the party of engineers was withdrawn from the work until the matter was settled.

The *Big I.* or *Big Interior* group of mineral claims has been fully described in the Annual Reports for the years 1906 and 1916.

With regard to the *Monitor* group of mineral claims on Alberni canal, on which development-work was suspended during the autumn of 1918, followed by a lawsuit instituted by James Skene against Samuel Ryder, of St. Albans, England, the owner, the lawsuit was settled out of Court in October last. During the pendency of this litigation it was not deemed advisable to continue the development-work, but it is hoped that during the coming season active operations will be resumed.

The *Monitor* group of mineral claims is fully described in the Annual Reports for 1917 and 1918.

BARKLEY SOUND SECTION.

Uchucklesit Harbour Subsection.

Saucy Lass Group.

This group of mineral claims was examined on May 3rd, 1920. It contains seven mineral claims known as the *Saucy Lass*, *Saucy Boy*, *Saucy Lass No. 1*, *Waterfrontage*, *Thunderbolt*, *Thunderbolt No. 1*, and *Iron Cap*, and is owned by T. H. Knight-Bayne, who resides on the property. The group is located on Cass (Cascade) creek near Kildonan Cannery, on Uchucklesit harbour, and extends from the waterfront for a distance of about a mile back into the mountains, with the respective boundaries of the claims adjoining each other. The waters in the upper part of Cass creek flow through the *Saucy Lass* and *Saucy Lass No. 1* mineral claims, on which most of the mining-work has been done.

Geology.—The rock formations occurring on the *Saucy Lass* group are made up for the most part of the Vancouver series of volcanic rocks, with interbedded limestones and rather extensive bodies of epidote, associated with which are occurrences of magnetite and chalcopyrite. These ore-bodies belong to the contact-metamorphic type. Intrusions of a black igneous rock with gneissic structure are noticeable in the immediate vicinity of the ore-bodies. This black rock is considerably sheared in places and the whole of the rock formations show much evidence of movement. There are several slickensided shear-planes.

Characteristics of Ore-deposits.—The occurrences of copper-sulphide ore on the *Saucy Lass* group so far found occur on the steep banks of Cass creek. There are apparently several isolated bodies of chalcopyrite, judging from the outcroppings, but sufficient development-work has not yet been done to warrant an unqualified opinion on this feature of the extent of the ore-bodies. The occurrences of chalcopyrite ore are associated with magnetite, garnet, and epidote and belong to the contact-metamorphic type of ore-deposits.

Two samples were taken from two apparently distinct occurrences. The first, a selected sample from near the portal of a short adit on the *Saucy Lass* claim in the steep easterly bank of Cass creek, assayed: Gold, trace; silver, 0.8 oz.; copper, 14.5 per cent. The second, from the portal of a short adit on the *Saucy Lass No. 1* claim in the westerly bank of Cass creek, assayed: Gold, trace; silver, trace; copper, 0.3 per cent.

Development-work.—The development-work consists of three adits—one 60 feet long, another 10 feet long, and the third 10 feet long. There is also a cabin on the property and a trail is being constructed from the shore of Uchucklesit harbour, in the construction of which Government assistance was rendered under the terms of the "Mineral Survey and Development Act."

CLAYOQUOT MINING DIVISION.

The extension of the development-work in the mine, reconstruction of the concentrating-mill and installation of water-power to replace steam on the *Indian Chief* mine, Sidney inlet, together with the beginning of development-work on the *You* group of mineral claims on Bedwell river, have been the chief events in the mining industry in the Clayoquot Mining Division during 1920. The usual assessment-work has been done in the Division during the past year on mineral claims that have not been Crown-granted, while on the *White* group on Tofino (formerly known as Deer) creek there was quite a considerable amount of development-work done in addition to the annual assessment-work. The writer had arranged to visit the *White* group during one of his

trips on the west coast of Vancouver island, but was unfortunately unable to do so after the work had been finished; consequently there is no detailed description of this work in the following report.

Dr. Victor Dolmage, of the Geological Survey of Canada, with his assistant, P. C. Emmons, made a reconnaissance of the geology along the coast-line and adjacent islands in the Clayoquot Mining Division during the past summer, the summary report of which will be published in the near future.

Central West Coast Section.

Ahousat Subsection.

Flores Island Coal.

On account of rumours of the discovery of a seam of coal on the south-west corner of Flores island near the entrance to Clayoquot sound, an examination of that section was made on August 10th and 11th last. The trip out was made by the Coast trail from the head of Matilda creek and the return trip by a trail crossing the interior of the island. Both of these trails were for the most part in bad condition; the distance by either is about 10 miles. By reason of the exposed coast on the west side of Flores island and the difficulty of landing except in extremely fine weather, when the sea is calm, one of the trail routes is usually taken by travellers.

Fitzpatrick's Land Lot No. 1565.—This land lot was taken up by Edward Fitzpatrick several years ago for ranching purposes and stocked with some cattle, chickens, and hogs. Later he claimed to have discovered a seam of coal and did some open-cut work in the bank of Cow creek, which flows into the sea about a quarter of a mile easterly from Fitzpatrick's cabin, which is situated about 2½ miles east of Raphael point, the extreme south-west corner of Flores island.

Geology.—The rock formation in the vicinity of Land Lot No 1565 is for the most part made up of granodiorite, but at low tide there is a well-defined narrow belt of light-coloured sandstone exposed, which has its line of strike towards the north-west and dips at varying angles towards the south-west, the angles of the dip being from 20° to 50°.

No outcroppings of coal indicating the occurrence of a seam of commercial value could be found by the writer, who was accompanied by Edward Fitzpatrick in his examination. The comparatively narrow belt of sandstone, apparently of the Cretaceous period, was thoroughly examined during extreme low tide, which at the time of the examination happened during the afternoon, thus affording every facility for a thorough examination.

Some very narrow seams of carbonaceous material were noted and sampled. An assay of the sample showed it to contain: Moisture, 0.7 per cent.; ash, 60 per cent.; volatile combustible matter and carbon, 39.3 per cent.

The sandstone-belt was traversed towards the west to a small bay locally known as Siwash bay, where there occurs a fairly extensive body of a dark-coloured sandstone dipping south-west 20° under the sea. This is overlain by a layer of dark-coloured conglomerate rock, much of which has been carried away by erosion. The conglomerate dips and strikes in conformity with the underlying sandstone. No indications of coal-outcroppings could be found, although this dark-coloured belt of sandstone was very thoroughly examined.

Mr. Fitzpatrick informed the writer that the place where he discovered an outcropping of a workable seam was in the bank of Cow creek, where he had done some prospecting-work some years previous, but that as the open-cut had caved there were no exposures of the coal-seam visible. However, Cow creek was examined, with the following results:—

The prevailing rock formation where it is exposed near the mouth of Cow creek is granodiorite, which farther up the creek is hidden by an undetermined thickness of a bluish-coloured glacial clay covered by a layer of gravel several feet thick. A shaft was being sunk in the gravel alongside the westerly bank of the creek for the purpose, as explained by Fitzpatrick, of continuing to sink through the gravel and clay in the expectation of finding coal underlying the clay. As this part of the formation occurs at a lower horizon in the series than the strata of sandstone already referred to, which is exposed about a quarter of a mile westerly from Cow creek, and dipping towards the south-west at an angle of about 55°, it appeared as though the work at the point where it was being done was a useless waste of energy.

Travelling up the creek about a mile, the geologic formation is that of a dark-blue slaty shale, dipping at an angle of 35° towards the south-west and apparently underlying the sandstone

strata. An open-cut had been made still farther up the creek, which had caved and, as Fitzpatrick claimed, had covered up and hidden the exposure of coal; consequently an examination was useless.

The conclusion arrived at after the examination was that, while there was some possibility that coal might occur in the Cretaceous sandstone, there were no indications sufficiently promising to warrant further work.

Sidney Inlet Subsection.

Indian Chief.

This property contains eight mineral claims owned by the Tidewater Copper Company, Limited. The boundaries of the claims, which adjoin each other, extend from the water-front on the West arm of Sidney inlet northerly across the summit of a mountain nearly 2,000 feet in elevation. The mine-workings have been very fully described in the Annual Reports for 1917, 1918, and 1919, so that the following report will be confined to the operations during 1920, from an examination made on August 7th last and from information received up to the end of that year.

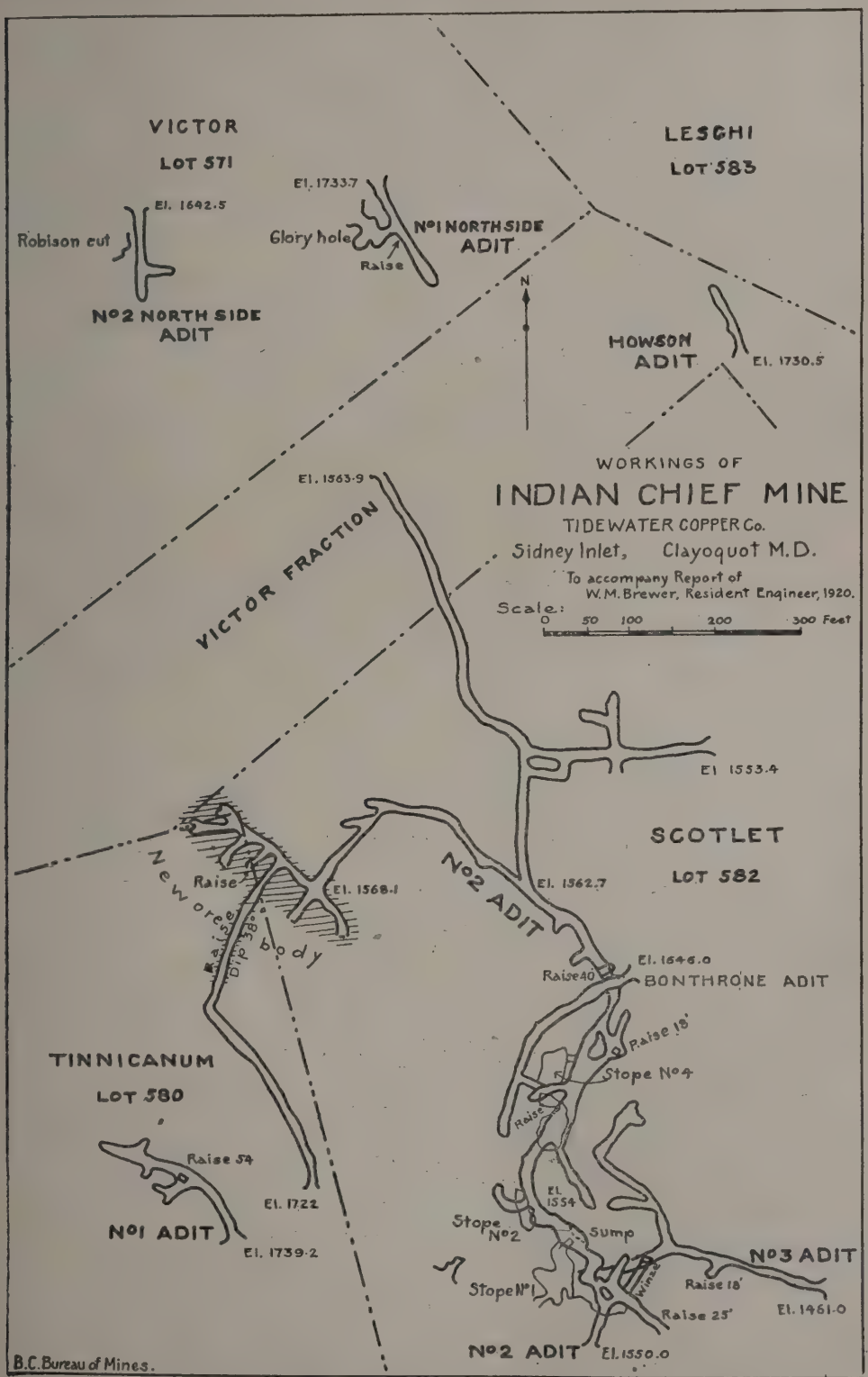
About September last H. B. Price, who had been the general manager since the spring of 1918, resigned to leave for Abangarez, Central America, to take the management of an extensive gold-mine for Minor Keith and associated capitalists, of New York. Previous to his departure he appointed D. M. Drumheller, Jr., general superintendent to superintend the operations at the mine and mill, and Mr. Drumheller still retains that position. S. P. Silverman is general manager, with headquarters in Victoria.

Beach Camp.—Before describing the extensions to the underground workings that have been made during 1920 it is deemed advisable to mention the improvements that have been carried on at the beach camp, where the concentrating-mill, lower terminal of the aerial tramway, and bunkers are located.

Two creeks—Indian and Mill creeks—flow down gulches from the summit of the mountain northerly from the beach camp, emptying into the West arm of Sidney inlet about a quarter of a mile from the camp. The waters from both these creeks have been diverted through flumes to a common penstock about 600 feet vertically above the beach. The flume from Indian creek is 4,300 feet long, 700 feet being of wood and 3,600 feet of galvanized iron strengthened by a framework of wood, and costing very much less per foot than the all-wood part. The flume from Mill creek is 1,200 feet long. The working-head of this water-power is 600 feet. From the penstock, into which both flumes discharge, there is a pipe-line 1,600 feet long to the wheel-house at sea-level, where eight Pelton wheels are housed and connected with individual dynamos, thus furnishing individual drives to all machinery in the mill, the compressor plant, and electric-light plant. Air from the compressor plant is carried from the beach to the mine by a pipe-line, while electricity for lighting at the mine camp, about 1,400 feet elevation above sea-level, is carried by wires.

The reconstruction of the concentrating-mill has increased its capacity to 300 tons of ore a day. A description of the flow-sheet is as follows: The mill is arranged so that the ore is brought from the mine by an aerial tramway, delivered over a 3-inch grizzly into a bin at the top of the mill building from the tram-buckets; the oversize passing through a 20 by 10 Blake crusher on to a ¾-inch grizzly, over which the undersize from the 3-inch grizzly also passes into a second bin equipped with a No. 2 Telesmith reduction-crusher. From this crusher all of the feed passes through a chute into the mill-bin. From the mill-bin the feed passes into a 6 by 5 Traylor ball-mill; thence into a Dorr classifier, from which all ore finer than 40-mesh passes directly into a battery of six 6-foot Peterson flotation-cells, while the coarser material passes from the classifier, as well as the underflow from the cells, to be reground in either a 5 by 22 tube-mill or a 5 by 4 ball-mill, from which the reground material is returned to the Peterson cells. The concentrates from the cells pass into a Dorr thickener, 16 by 22, and the overflow from the cells is carried to tailings-dump. The overflow from the Dorr thickener is also carried to a tailings-dump, while the underflow goes into a 10 by 12 Oliver filter, from which the concentrates go into a 6 by 24 Lowden dryer and thence to the shipping-bin. The entire system of treatment works automatically; consequently the cost for manual labour is cut down to the lowest possible minimum.

Development-work.—In the Annual Report of the Minister of Mines for 1919 a full description and plan of the extension of the development-work that had been done since 1917 was published,


VICTOR
LOT 571
El. 1642.5
Robison cut
No 2 NORTH SIDE ADIT
El. 1733.7
Glory hole
No 1 NORTH SIDE ADIT
Raise
LESCHI
LOT 583
N
HOWSON ADIT
El. 1730.5
WORKINGS OF
INDIAN CHIEF MINE
TIDEWATER COPPER Co.
Sidney Inlet, Clayoquot M.D.
To accompany Report of
W.M. Brewer, Resident Engineer, 1920.
Scale:
0 50 100 200 300 Feet
El. 1563.9
VICTOR FRACTION
El. 1553.4
SCOTLET
LOT 582
No 2 ADIT
El. 1562.7
El. 1568.1
New ore body
Raise
Dip 38°
El. 1646.0
Raise 40
BONTHRONE ADIT
Raise 18'
Stope No 4
TINNICANUM
LOT 580
Raise 54
El. 1722
No 1 ADIT
El. 1739.2
El. 1554
Stope No 2
Sump
No 3 ADIT
Stope No 1
Raise 18'
Raise 25'
El. 1461.0
No 2 ADIT
El. 1550.0
B.C. Bureau of Mines.

with particular reference to the ore-body that had been exposed by the south-west drill-hole bored from the main No. 2 South side adit at a point about 100 feet northerly from the junction of the Green or No. 2 East drift with the main No. 2 South side adit. During 1920 most of the development-work has ben confined to extending the West drift to a length of 500 feet, cross-cutting the ore-body by driving three crosscuts towards the south-west from the West drift; No. 1 being about 30 feet long, No. 2 about 60 feet long, and No. 3 about 60 feet long; also making a raise about 300 feet on the foot-wall of the ore-body on an incline of 38°, which connects with an adit driven about 150 feet long, with its portal at an elevation of 1,722 feet above sea-level and about 350 feet north-westerly from the portal of the main No. 2 South side adit, which, though, is at an elevation of 1,550 feet above sea-level. The top of the raise is about 150 feet vertically below the surface.

This work has blocked out a tonnage of "actual" ore, with working-openings exposing three sides, of approximately 200,000 tons, and assures, without necessitating sinking, a production of about 300 tons of ore a day for two years from this one ore-body.

In addition to the development-work above recorded, two stopes, each 50 by 50 feet, were opened during the summer of 1920 and production of ore for transportation to the mill was begun.

Owing to an extremely dry summer season it was not possible to start the mill by water-power until in September last, and owing to the difficulty of obtaining a vessel to carry concentrates to the Tacoma smelter it was not until December last that the first cargo of about 400 tons was shipped.

QUATSINO MINING DIVISION.

KYUQUOT SOUND SECTION.

Since about 1903 until during the season of 1919 the Kyuquot Sound section of the Quatsino Mining Division received but little attention from prospectors, but during the seasons of 1919 and 1920 a few prospectors selected that field for their operations. The result was the staking of the *Caledonia* group of mineral claims on the Kokshittle river, which flows into the arm of that name at its extreme head, also of a group on Kokshittle arm near its head. These groups will be described later in the following report.

Quartz-Alunite Rocks.

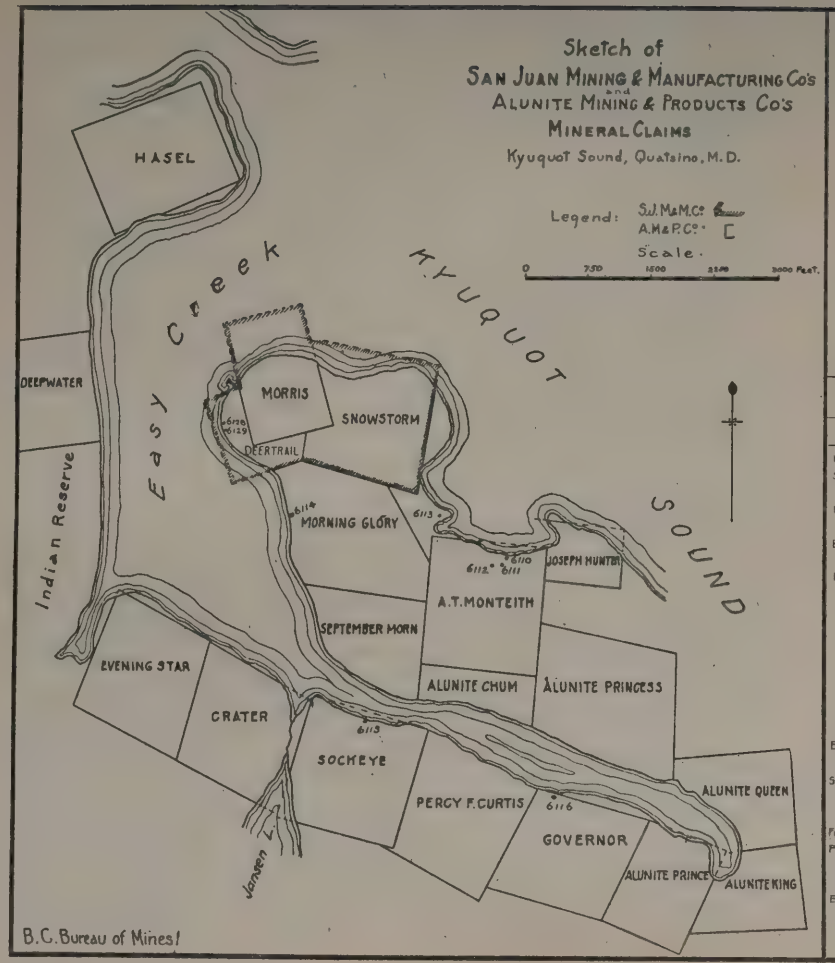
The Summary Report for 1913, Geological Survey of Canada, pages 109–126, contains a description by Dr. C. H. Clapp of alunite or natro-alunite rocks carrying a percentage of potash situated on Kokshittle arm of Kyuquot sound. Dr. Clapp fully described the geologic occurrence of the alunite and pyrophylite rocks; consequently it is not necessary in this report to repeat his descriptions. During recent years so many statements have been made by the owners of the mineral claims described in Clapp's report, relative to the occurrence of soluble potash in commercial quantities in the quartz-alunite rocks, that these have attracted much attention from the public and created considerable comment.

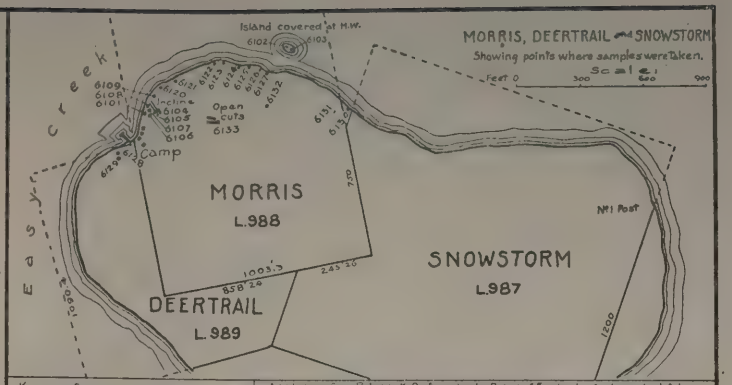
The necessity of verifying statements with regard to the potash in the rocks was considered of such importance that the Honourable the Minister of Mines requested Philip B. Freeland, Resident Engineer for Mineral District No. 4, to accompany the writer in making an examination and systematic sampling of the rocks which, it was alleged, contained potash in commercial quantities, the potash contents to be the primary feature of such report.

The party, including two men to assist in drilling and sampling, in addition to the engineers mentioned, together with John J. Baird, manager of the San Juan Mining and Manufacturing Company, and Doctor Alfred R. Baird, managing director of the Alunite Mining and Products Company, Limited, left Victoria on February 20th, 1920, on the Canadian Pacific Railway Company Coast steamer "Princess Maquinna" and arrived on the property on February 24th. From that time until March 6th was occupied in doing the work necessary.

San Juan Mining and Manufacturing Co.—This company owns the Crown-granted mineral claims known as the *Morris*, *Snowstorm*, and *Deer Trail*, as shown in the accompanying map on the north-westerly part of a peninsula between the Kokshittle arm of Kyuquot sound and Easy creek.

During the examination of the several mineral claims the representatives of their respective companies were consulted as to the areas on which the most encouraging results as to the occurrence of potash (K_2O) could be obtained, and, in sampling the engineers were guided by





KYUQUOT SOUND CLAIMS. Table of Analyses To accompany Report of W.M. Brewer, 1920

Analyses for Potash (K_2O): Samples by Brewer & Freeland; analyses by J. Adams.

Location whence sample came	Owners	Mineral Claim	B.C. Govt Laboratory Sample No.	Total K_2O in crude rock by fusion method A	Crude rock roasted 4 hrs at 850°C: Water Soluble K_2O in roasted rock treated as above B	Crude rock roasted 4 hrs at 850°C: Water Soluble K_2O in roasted rock calculated basis dry crude rock C	Other Check Analyses				
Holes blasted along shore	San Juan M. & M. Co.	Morris	6101		20.0	0.80	0.64	A		3.33	3.14	2.68	3.65
Small island, submerged at high tide, 300 ft. from shore	"	"	6102	3.40	23.8	2.88	2.20	B		22.82	22.50	26.10	
" " "	"	"	6103		22.0	1.30	1.10	C	3.06	3.13	3.36	3.16	2.14
Face of inclined shaft	"	"	6104		22.0	0.70	0.55	D		2.45	2.60	2.34	
" " "	"	"	6105		17.0	0.70	0.69						
Bluff in which are an adit and shaft	"	"	6106		19.0	0.90	0.73						
" " "	"	"	6107		18.0	1.30	1.07						
Holes blasted along shore	"	"	6108		19.0	1.90	1.54						
" " "	"	"	6109		4.0	Trace	Trace						
" " "	"	"	6120		12.0	0.90	0.80						
" " "	"	"	6121		4.5	Trace	Trace						
" " "	"	"	6122		12.5	1.10	0.97						
" " "	"	"	6123		17.5	2.00	1.66						
" " "	"	"	6124		17.0	2.60	2.16						
" " "	"	"	6125		18.3	2.10	1.72	A		3.19	3.10	2.10	3.42
" " "	"	"	6126	3.10	18.5	2.23	1.83	B		18.05	17.61	21.20	
" " "	"	"	6127		22.0	2.30	1.80	C	2.72	2.89	3.24	2.44	2.02
East shore, Easy Creek	"	Deertrail	6128		5.0	Trace	Trace	D		2.38	2.47	1.92	
" " "	"	"	6129		6.0	Trace	Trace						
Sample across 28' out cropping	"	Snowstorm	6130		1.0	Trace	Trace						
From bluff 20' above water	"	Morris	6131		1.0	Trace	Trace						
" " 40' " "	"	"	6132		25.0	3.50	2.62						
From Zopen cuts 70' " "	"	"	6133		18.0	0.90	0.75						
Facing Kokshittle inlet	Alunite M. & Products Co.	Monteith	6110		21.0	0.90	0.89						
" " "	"	"	6111		2.0	Trace	Trace						
" " "	"	"	6112		4.0	0.20	0.19						
East shore, Easy Creek	"	Hastie	6113		0.5	Trace	Trace						
" " "	"	Morning Glory	6114		3.5	0.10	0.09						
" " "	"	Sockeye	6115		2.3	Trace	Trace						
" " "	"	Governor	6116		4.1	Trace	Trace						

the advice received from J. J. Baird as to the property of the San Juan Mining and Manufacturing Company, and from Doctor Alfred R. Baird as to the property of the Alunite Mining and Products Company, Limited.

On account of the very limited quantity of development-work on the claims, the heavy overburden, down timber, and underbrush which covers the rock formation, it was not possible to sample cross-sections systematically; therefore the several exposed outcroppings occurring near and along the beach at about high-tide mark, apparently parallel, or nearly so, with the line of strike of quartz-alunite rocks, were selected as offering the best opportunity to secure fair representative samples. Holes about 18 inches deep were drilled at the several points designated in the accompanying assay plan as Nos. 6101–6109 and 6120–6133. The assay results from these samples for potash contents are given on the attached table of analyses. From reference to this it is shown that the boundaries of the deposit are confined to the *Morris* mineral claim.

In the attached table of analyses it will be noted that the results in columns C and D are given in percentages of water-soluble potash (K_2O), which is the customary method adopted in commerce, as for fertilizing purposes the water-soluble content only is given consideration.

The direction of the strike of the rocks is east, with their dip at an angle of about 35° to the south. The boundaries of the quartz-alunite rocks along the line of strike, in which the content of potash (K_2O) is 2 per cent. or over, are apparently between the points sampled; as, Nos. 6123–6127, a distance of approximately 300 feet, with a possibility that the deposit may extend under the water to the small island, which is submerged at high tide, an additional 300 feet. The samples from this island are numbered 6102 and 6103.

All of the other samples taken, not only on the *Morris* mineral claim, but also on the *Deer Trail* and *Snowstorm*, yielded less than 2 per cent. potash (K_2O).

Alunite Mining and Products Co., Ltd.—This company owns the following named mineral claims on the same peninsula as those owned by the San Juan Mining and Manufacturing Company: *A. T. Monteith, Joseph Hunter Fraction, Athens Fraction, Hastie, Morning Glory, September Morn, Alunite Chum, Alunite Princess, Alunite Queen,* and *Alunite King.* The company also owns the following named mineral claims on the southerly side of Easy creek, opposite the peninsula: *Alunite Prince, Governor, Percy F. Curtis, Sockeye, Crater,* and *Evening Star;* also the *Deepwater* and *Hasel* on the west side of Easy creek.

Samples numbered 6110–6116 were taken from some of these claims from points marked on the accompanying assay plan, but as none of these samples carried any appreciable quantity of potash (K_2O) as shown by the results from assays it is, deemed unnecessary to describe the property of the Alunite Mining and Products Company, Limited, in this report, for the reason that the primary object of the examination and sampling was to determine whether the quartz-alunite rocks contained potash (K_2O) in commercial quantities.

The writer deems it advisable to include in the present report copies of correspondence exchanged between the Provincial Mineralogist at Victoria and A. E. Wells, of the Department of the Interior, Bureau of Mines, Mining Experiment Station, Salt Lake City, Utah, as follows:—

"BUREAU OF MINES,
VICTORIA, B.C., June 11th, 1920.

"*Bureau of Mines,*
Washington, D.C.

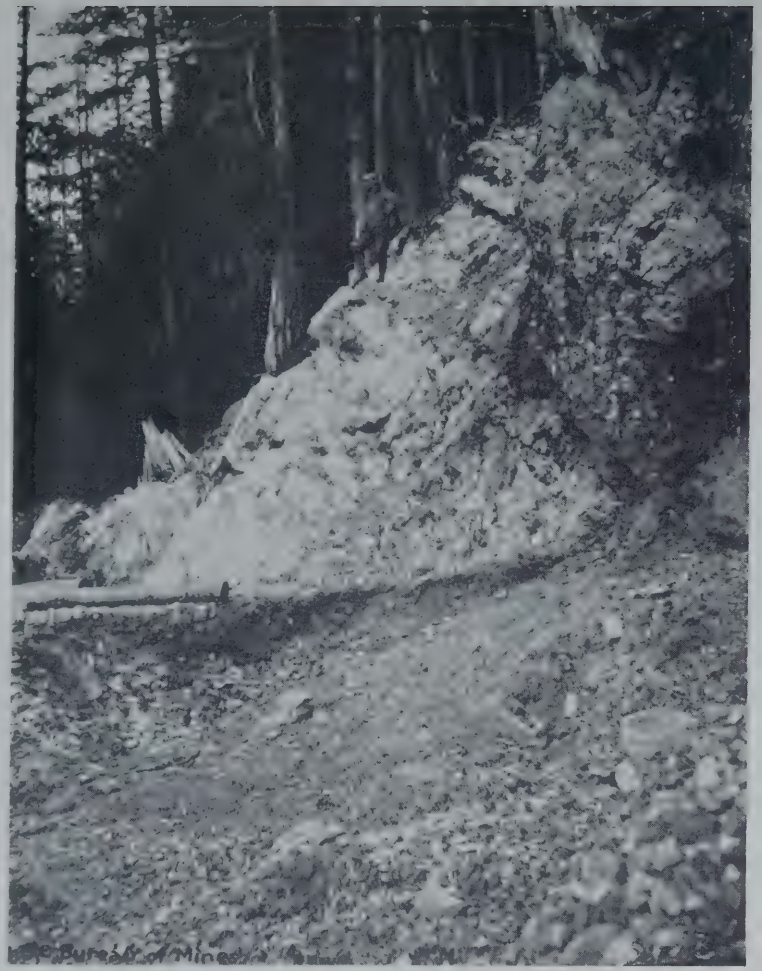
"*Attention Mr. Arthur Wells.*

"DEAR SIR,—I would be greatly obliged if you would kindly allow me to take advantage of your greater experience and research into the question of the production of potash from alunite, and favour me with a little advice on a question that has been placed before me here officially.

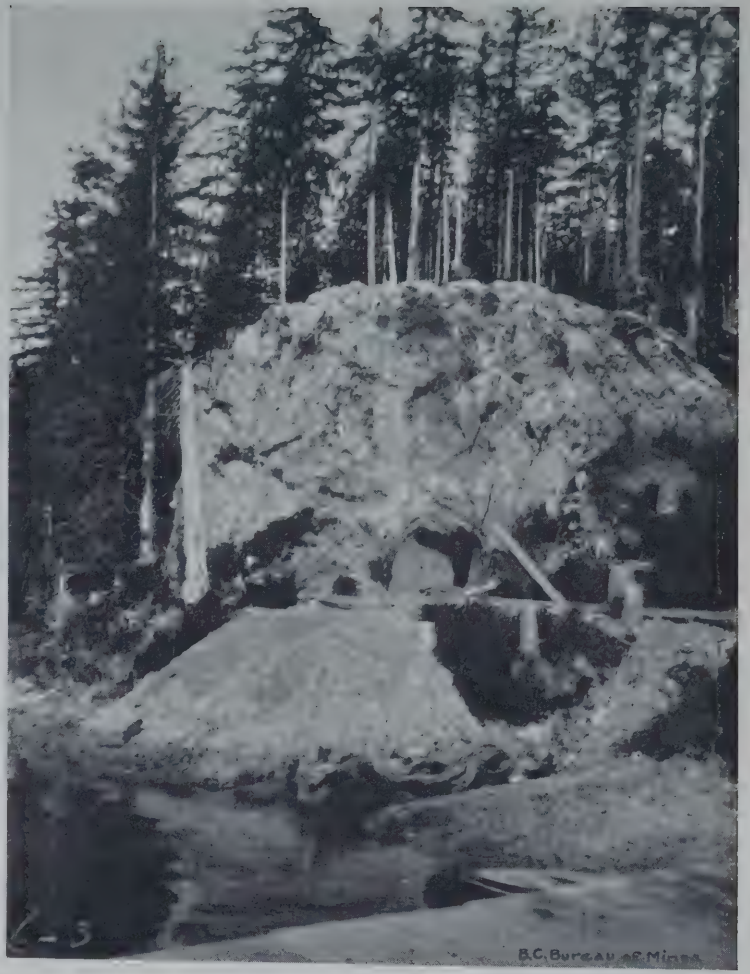
"We have a deposit of rock on the west coast of Vancouver island which has recently been thoroughly sampled, and some thirty analyses made of the ore after roasting for four hours at a temperature of from 700° to 850° C.

"The loss in weight in roasting varies from 17 to 24 per cent. and will average about 20 per cent.

"The roasted mineral was leached with hot water, and the highest water Sol. Potash found in such roast was 3.36 per cent. K_2O, which was equivalent to 2.60 per cent. on the crude ore.



September Morn Claim, Kyuquot Sound.



Morris Claim, Kyuquot Sound.

"As far as I can gather from your report, at Marysvale they did not find 9 per cent. K_2O profitable, and their ore was low in silica and silicates, whereas ours is high.

"Our highest assay is less than 3.5 per cent. K_2O, but even if we were to assume 3.5 per cent. K_2O as our average, would that bring our deposit even within the range of practical consideration as a commercial possibility?

"Can you give me any figures as to costs of grinding, roasting, leaching, and crystallizing out salts?

"Our investigations as to analyses show that the results we obtained by the platinic chloride are somewhat lower than those obtained by the perchloric method, but we have a suspicion that some soda is included in latter results.

"What method is commercially accepted now in the trade? Could you refer me to a publication describing the method of analysis you consider best? I would be greatly obliged if you could give me the benefit of your investigations on this matter.

"I am,

Yours truly,

"(Sgd.) WM. F. ROBERTSON,

Provincial Mineralogist."

"DEPARTMENT OF THE INTERIOR,
BUREAU OF MINES,
MINING EXPERIMENT STATION,
SALT LAKE CITY, UTAH, June 20th, 1920.

"Mr. Wm. F. Robertson,
Department of Mines,
Office of the Provincial Mineralogist, Victoria, B.C.

"DEAR SIR,—I have your letter of June 11th asking in regard to the cost of treating alunite at Marysvale, Utah.

"There was only one large plant at Marysvale and that was the plant of the Mineral Products Company, which has subsequently been bought out by the Armour Fertilizer Works. As you stated in your letter, their ore ran not less than 9 per cent. K_2O and was low in silica and silicates. I have no definite figures regarding the costs of mining, roasting, leaching, and crystallizing out the salts, as that company has been very reluctant to give out such data. However, from what I can learn, the costs were such that they could not expect to operate and make money with the market for potash at less than $2 per unit on the Atlantic seaboard. It is my impression that their potash in potassium sulphate cost them about $2 per unit when they were operating in 1918, and again in the summer of 1919. I do not see how material containing less than 3.5 per cent. K_2O could possibly be treated for the production of potash salts at a cost of less than $3 per unit K_2O. I would say definitely that a 3½-per-cent. material in this country (U.S.) would not be within the range of practical consideration as a commercial possibility. There may be places where locally the cost of potash is so high that the treatment of such material would be commercially a possibility, but certainly not in the United States. The nearest approach to the treatment of such low-grade material of which I have a knowledge is the treatment of the shales from Atlanta, Georgia. At that point the shales can be mined at a very low cost and can be ground at a low figure, as they are easily broken up. The cost to roast is low because the shales do not have to be heated above 800° C. Subsequent leaching and crystallizing operations involve no special difficulties. With all these favourable factors, nevertheless, the cost of recovering potash salts from shales containing 6 per cent. potash is not less than $1.50 per unit K_2O contained.

"In regard to the method of analysis: The method generally used by the Bureau of Mines staff is that described by R. C. Hall and E. H. Schwartz in the *Journal of Industrial Engineering Chemistry*, Volume 9, page 785, 1917. In this method potash is precipitated by cobalti nitrite and the precipitated sodium potassium cobalti nitrite is oxidized by permanganate.

"Very truly yours,

"(Sgd.) A. E. WELLS."

The foregoing copy of the letter from Mr. Wells appears to the writer to practically settle the question as to the commercial possibilities possessed by the mineral claims included in this report so far as the use of the alunite rock for a fertilizer is concerned, and it would appear

unnecessary to continue this report further than to state, in conclusion definitely, that so far as the potash content of the rock is concerned it is of too low a percentage to be considered as a commercial possibility for fertilizing purposes.

Caledonia Group.

This group contains fifteen mineral claims, named *Caledonia Nos. 1* to *14* and the *Caledonia Falls* claim, and is owned by J. Dernberger and Charles G. Nordstrom, post-office address Kyuquot Whaling Station, entered in the "Postal Guide" as Cachalot, with whom was associated Dr. Alfred R. Baird, of Vancouver, at the time the examination was made on February 29th, 1920. The group is located about 1½ miles from the head of Kokshittle arm of Kyuquot sound, near the Kokshittle river, which flows through a box canyon for about a mile, in which are a succession of falls that would furnish a good water-power if developed.

Geology.—The rock formation on the *Caledonia* group of mineral claims is made up largely of the Vancouver volcanics, and in the vicinity of outcroppings of copper-sulphide ore the country-rock, as classified by Dr. Victor Dolmage, of the Canada Geological Survey, is a silicified argillaceous tuff composed of quartz, andesine feldspar, chlorite, volcanic glass, carbonaceous material, kaolin, and a small quantity of magnetite. A belt of white crystalline limestone occurs about 700 feet south-easterly from the ore-bearing zone. The volcanic rocks are considerably sheared, fissured, altered, and fractured.

Characteristics of Ore-deposits.—As the *Caledonia* group of mineral claims had only been located in July, 1919, when the occurrence of outcroppings of magnetite and copper-sulphide ores was discovered, there was only a very limited amount of mining-development work done previous to the examination at the end of February, 1920.

There are several isolated outcroppings on *Caledonia Nos. 5* and *6* claims which appear to occur in a dimly defined zone which has its line of strike in a general north-easterly direction, but further development may demonstrate that the outcroppings belong to separate mineralized zones which parallel each other and strike in a general north-westerly direction. The outcroppings apparently belong to the contact-metamorphic type of ore-deposits, although, so far as is known at present, they do not occur at or very near the contact of the volcanic rocks with crystalline limestone, which occurs about 700 feet distant.

The presence of considerable quantities of epidote and garnet rock, which make up the gangue in which the minerals found in the outcroppings occur, indicates the contact-metamorphic origin. The minerals occurring in the outcroppings are: Magnetite, chalcopyrite, some bornite, and occasionally copper-carbonate stains. Shallow open-cuts have been made to expose the ore-bodies below the surface.

Samples were taken from three open-cuts, which assayed as follows:— No. 1: Gold, trace; silver, 0.2 oz.; copper, 0.5 per cent. No. 2: Gold, trace; silver, trace; copper, 4 per cent. No. 3: Gold, trace; silver, trace; copper, 3.7 per cent.

Development-work.—The mining-work on February 29th last consisted of several open-cuts and some stripping. A blacksmith-shop 10 by 10 feet had been built near the mine-workings. Camp buildings consisted of a cabin 16 by 22 feet, with kitchen addition 10 by 14 feet, and cellar for vegetables 10 by 10 feet. These buildings are on the *Caledonia Falls* mineral claim overlooking the falls in Kokshittle river.

South-east Arm Section.

Elk Lake Subsection.

Old Sport.

This mine is owned by the Coast Copper Company and is operated under the management of Wm. Clancy, who with a crew of about thirty men has continued development-work during 1920 on the *Old Sport* and other adjoining groups of mineral claims. As this property was described in detail in the Annual Reports for 1916, pages 240, 241; for 1917, page 255; and for 1919, pages 203–205, it is only necessary in this report to refer to the extension of the development-work done during the past year.

This has been confined to driving the lower adit to intersect the *Old Sport* ore-body. The length of the adit is 2,000 feet; it is driven all the way from the foot-wall side of the ore-body in diorite and is 475 feet vertically below the outcrop, or 800 feet on the dip of the vein on a 37° incline.

In addition to this work, the regular assessment-work has been done on the other groups of mineral claims which comprise the property—namely, *Penstock*, *Idaho*, *Edith*, and *Machete* groups.

NANAIMO MINING DIVISION.

In the Annual Report for 1919, the writer, on pages 207–209, gave a full geographical description of the Mainland part of the Nanaimo Mining Division, together with a list of the various streams from which it was possible to develop water-power situated on the Mainland, as well as on Vancouver island, within the boundaries of the Division. In the following report that part of Vancouver island that is in the Nanaimo Mining Division will receive more attention because of its having been more closely examined during 1920 than in past years, also for the reason that a trip into the only partially explored northern section of the Division on the Mainland had to be postponed owing to the inclemency of the weather in September, which was the earliest date possible to make it on account of other departmental business.

During the coming summer it is proposed to make as thorough an examination as possible of the northern section, especially of the country bordering on the Klinaklini river and Tatlayoko lake, where it is reliably reported that considerable activity in prospecting and development work was manifested during the late summer of 1920. This is shown by the fact that twenty-nine locations of mineral claims were recorded on Chromium creek, a tributary of the Klinaklini river, and that arrangements were made to haul machinery for a small concentrating plant to be erected on the property of the Tatlayoko Gold Mines Company, Limited.

COAL-MINING INDUSTRY.

The most important industry in the Nanaimo Mining Division is coal-mining. All of the producing collieries on Vancouver island are in that Division, as well as nearly all of the area underlain by the coal-measures.

When it is considered that during 1920 the collieries produced a total of 1,801,731 long tons of coal, employed about 4,000 men in all capacities above and underground, and paid out approximately $500,000 each month for wages, independent of the amounts paid out for machinery, explosives, rails, and general supplies, some idea can be formed of the importance of the industry in the Nanaimo Mining Division on Vancouver island. One of the most outstanding features of that industry during 1920 was the increased total output over that of 1919, which was 102,383 long tons.

With the above-mentioned facts in view, it is considered to be desirable to refer in this report briefly to some of the main features connected with the coalfields along the north-easterly coast of Vancouver island.

There are three recognized coal-basins in the Nanaimo Mining Division—namely, Nanaimo, Comox, and Suquash—with Nanaimo as the most southerly, of which the city of Nanaimo is the main centre, although geographically near the north-western boundary of the productive area. The Comox basin is north-easterly from the Nanaimo and separated from it by an axis of Vancouver volcanics which occur north and south of Nanoose bay; its distributing centre is the town of Cumberland, about 70 miles distant from Nanaimo in a north-easterly direction. The Suquash basin occurs about 120 miles up the north-east coast of Vancouver island from Cumberland, and is separated from the Comox basin by a wide belt of Vancouver volcanics extending from near Menzies bay, the northerly boundary of the Comox basin, to Port McNeill, the south-easterly boundary of the Suquash basin; its nearest distributing centre is Sointula, on the south side of Malcolm island.

Suquash Coalfield.

The Suquash coalfield was the earliest discovery of coal on Vancouver island. This was made by Indians in 1835, and attention was first directed to it by Dr. W. F. Tolmie, of the Hudson's Bay Company's post, Fort McLaughlin, Milbanke sound. Mining on a limited scale was carried on by the Hudson's Bay Company until 1853; since then the mine has been idle, except spasmodically, during recent years after it was acquired by the Pacific Coast Coal Mines, Limited.

During the summer of 1920 that company sent an engineer and crew of miners to unwater and reopen the mine with the intention of shipping coal, but up to date this intention has not materialized and work has again been suspended.

Aside from information contained in a report by Dr. G. M. Dawson in the Annual Report, Geological Survey of Canada, Vol. II., 1886, pages 61–70B, also in a short report by Chas. H. Clapp in Summary Report, Geological Survey of Canada, 1911, page 106, both of which are referred to by D. B. Dowling in Memoir 69, Can. Dept. of Mines, "Coalfields of British Columbia," 1915, pages 112–124, there is comparatively little known as to the possibilities of the Suquash coalfield.

Clapp states: "The basin is, however, somewhat larger than generally supposed, containing Malcolm and Cormorant islands and possibly extending south-west to Quatsino sound. On account of the uniformity and regularity of the coal-seams and strata and their small amount of disturbance, the mining conditions are excellent. The coal is of good quality, burning with a long flame and little smoke. The large number of partings in the seam which is at present being worked and the thinness of the other known seams are the chief disadvantages of the field. The conditions are such, however, as to greatly encourage further development and prospecting, especially in the lower part of the measures."

The extent of the Cretaceous rocks, chiefly sandstone, in the Suquash coalfield along the north-east coast of Vancouver island is about 14 miles from Port McNeill, or about 7 miles south-easterly from the Suquash coal-mine to Beaver harbour, about 7 miles north-westerly from it.

Comox Coalfield.

The Comox coalfield extends in a south-easterly direction from a point about 10 miles north-westerly from Menzies bay, about 20 miles north-west from the northern boundary of the Esquimalt & Nanaimo Land Grant, to North-west bay, about 18 miles northerly from Nanaimo. It is bounded on the south-west by the Beaufort range of mountains and on the north-east by the strait of Georgia. Excepting the short reports by James Richardson and C. H. Clapp, the former contained in the Report of Progress, Geological Survey of Canada, 1876–77, pages 161–170, and the latter in Summary Report, Geological Survey of Canada, 1911, pages 105–106, there is no literature published relative to the Comox coalfield. The late Wm. Sutton, Geologist for the Wellington Collieries Company, and later for the Canadian Collieries (Dunsmuir), Limited, made a detailed geological report and map of the area for the private information of those companies, which have not been published.

The first development-work in the Comox field was done by Robert Dunsmuir in 1888 at the Union Collieries in Cumberland, where the mines are still being operated and producing the bulk of the production made by the Canadian Collieries (Dunsmuir), Limited, which is the only operating company in the Comox coalfield.

The producing area is at present confined to the Cumberland mines, about midway between the south-eastern and north-western boundaries of the Comox field, and although considerable drilling has been done in other parts of the field, but little is known of the possibilities of the discovery of workable seams of coal, except to the private organizations which have undertaken the enterprise.

Henry S. Fleming resigned as vice-president of the Canadian Collieries (Dunsmuir), Limited, during the autumn, and J. M. Savage, general manager, was promoted to the position previously occupied by Mr. Fleming, as well as being elected a member of the directorate; but continues to fill the position of general manager in addition to taking over the other duties and responsibilities, while Thos. Graham remains as general superintendent.

In the Cumberland section the Canadian Collieries (Dunsmuir), Limited, has been prospecting with two diamond-drills on the Tsable river, which empties into Baynes sound opposite Denman island, during 1919 and 1920. During 1920 there has been a total of 7,453 feet of diamond-drilling and 37,400 feet of roadways completed.

As all of the details relative to the producing coal-mines in and around Cumberland are given in the report of the Inspector of Mines, it is unnecessary to refer to such in this report.

Some years ago prospecting for workable coal-seams was carried on by Messrs. McGowan and Priest, of Vancouver, in the north-westerly part of the Comox field outside of the Esquimalt & Nanaimo Land Grant, and more recently rumours have been circulated that Thos. Stockett, predecessor to George W. Bowen, the present general manager of the Canadian Western Fuel Company at Nanaimo, purposed developing that part of the field under an option of purchase held by him. Up to the present time these rumours have not resulted in any activity.

The following extract from the report of Chas. H. Clapp is interesting at the present time when coal is attracting so much attention, due to the scarcity of fuel-oil. He says: "In the Comox field the coal is found in several seams that occur in a sandstone formation closely resembling the Protection formation of the Nanaimo series. Three of the seams have been mined. The formation, which may be called the Comox formation, consists chiefly of a white or greyish-white sandstone, composed largely of rounded quartz grains with a coating of kaolin and with accessory chloritic micas. Interbedded in the sandstone are thin beds of carbonaceous sandy shale, with which the coal is usually associated. The formation has a maximum thickness of about 800 feet and rests directly on the metamorphic volcanics of the Vancouver group. It is overlain by a thick group of shales, called the Trent River shales, which are very much like the Cedar District shales that overlie the Protection sandstone in the Nanaimo district. The sediments of the Comox basin have a much simpler and more regular structure than those of the Nanaimo basin, and form, in general, a simple monocline with a low uniform dip of about 10° to the north-east. The coal-seams are more regular than those of the Nanaimo basin and must be the result of a more uniform condition of sedimentation, although a similar uniformity of conditions appears to have existed in the Nanaimo basin during the deposition of the Protection formation. However, the coal-seams of the Comox district show, but to a less degree, the pinching and swelling and sharp rolls so characteristic of the Nanaimo coal-seams. Large wants due to a replacement of the coal by silts are probably more frequent in the Comox field. One peculiar feature met with in the Comox field is not met with in the Nanaimo field. The lowest seam of the former field occurs very near the base of the Comox sandstone, and as the Comox basin resembles the Nanaimo basin in that the crystalline rock surface. on which the sediments are deposited, was very irregular, many of the higher irregularities of the base remained above the depositional level when the lowest seam was deposited, and in consequence the lowest seam is frequently cut off by knobs of the underlying volcanics projecting through it. There is also another feature which is not met with in the Nanaimo field. North of the producing mine in the Comox field between Brown and Puntledge rivers a dacite porphyry has broken through the Comox sandstone and forms a flow or intrusive sheet which overlies it. Near the dacite-porphyry intrusion, which occurs near the outcrop of the lowest seam on Brown river, the coal is broken, partially coked, and rendered valueless. It is probable that the intrusion of dacite-porphyry occurred in early Tertiary times and was a phase of the widespread Eocene volcanic activity."

Nanoose Coalfield.

Coal-bearing areas of limited extent occur in an isolated field a short distance easterly from Blynden point, near the entrance to Nanoose harbour, between the south-eastern boundary of the Comox field and the north-western boundary of the Nanaimo field, as described in Clapp's and Richardson's reports. The occurrence of coal in this location indicates that it is an outlier of the Wellington seam, the lowest of the seams in the Nanaimo basin, and appears to be cut off from that basin by the axis of Vancouver volcanics referred to by Clapp as occurring to the north of Departure bay, a short distance north of the old Brechin mine, which is known as the northern boundary of the Newcastle and Douglas coal-seams.

This field was first developed on a limited scale several years ago, but operations were abandoned previous to 1898, when it was known as "Jack's coal-mine." In 1915 interest was revived in the field by the securing by John Grant, of Nanaimo, and associates, as the Nanoose Collieries Company, of some foreshore leases in addition to the Jack property. A shaft was then sunk 133 feet deep near the beach, and later an endeavour made to mine the coal on the dip under the strait of Georgia; but, although a slope was driven for about 700 feet, the angle of the dip was not sufficient to gain the requisite depth below the bottom of the sea, as provided by the "Coal-mines Act," to enable the operators to open rooms from the slope, but the life of the mine was saved by the company securing a lease in 1919 from the Canadian Collieries (Dunsmuir), Limited, of an area of the coal-basin adjoining the property the company already owned. This enabled the management to mine under solid ground. In the autumn of 1919 the Nanoose Collieries Company sold out to the Nanoose-Wellington Coal Company, a full description of whose operations and new plant, including washery, etc., was given in the Annual Report for 1919; consequently it is unnecessary to here repeat it. The fact that the production of the

mine during 1920 was more than double that made during 1919 makes a most satisfactory showing for the area that may be called the Nanoose coalfield to distinguish it from the Nanaimo or Comox fields.

Nanaimo Coalfield.

There has been so much more information about the Nanaimo coal-mines published from time to time than about the other coalfields on Vancouver island that it seems almost unnecessary for the writer to devote any space to the subject, especially in view of the fact that the report of the Mines Inspector for the district will give full details relative to the operation of the several collieries in the field. There have, however, been some notable events happening during 1920 connected with coal-mining in the Nanaimo field on Vancouver island which merit mention in this report, because they point to an increased production and necessarily increased prosperity in that part of the island which to-day ranks as the equal of, if not superior to, any other portion of the Province in regard to industrial development.

In this respect it is well to call attention to the estimated extent of the Nanaimo coalfield according to Clapp's report, of which he says: "The Nanaimo basin on Vancouver island extends south-east from Departure bay, north of Nanaimo, to Crofton, a distance of about 30 miles. Its greatest inland extent south of Nanaimo is about 10 miles. It extends, however, much farther east and south-east, comprising the northern part of Saltspring Island and the islands to the east and north; extending still farther south-east to the islands in the State of Washington. Its greatest exposed length and width in Canadian territory is 55 and 15 miles respectively."

The Canadian Western Fuel Company, Limited, which operates the No. 1 or Esplanade, Reserve, Harewood, and Wakesiah mines, Nanaimo, has increased the production during 1920 by approximately 60,000 tons over the 1919 production of 638,565 long tons, and retains the distinction of not only operating the oldest coal-mine on Vancouver island, but also the largest producer.

In that part of the Nanaimo field known as the Wellington-Extension section the Canadian Collieries (Dunsmuir), Limited, has been prospecting the section of the Cedar district known as the Haslam flats, where one diamond-drill has been in operation during 1920, by which about 1,000 feet has been bored.

The Granby Consolidated Mining, Smelting, and Power Company completed the equipment of the Blainey loading-dock near Ladysmith by installing a rubber belt-conveyor 1,300 feet long which connects the small storage-bins with the hold of a vessel at the wharf. In the coal-washing plant at Cassidy seven Overstrom concentrating-tables have been installed for the purpose of more thoroughly cleaning the slack coal than was possible with jigs alone. A new radial drill, a shaper, and other equipment have been added to the machine-shop. The main slope has been extended about 1,000 feet during 1920, thus reaching a total length of 3,500 feet, passing through that part of the field in litigation and into that section the title of which is not in dispute. The output from the mine has been very considerably increased during the last six months. A Dorr thickener is being installed near the washing plant; the tank of the thickener is 75 feet in diameter by 13 feet high on a concrete foundation. The ventilating equipment at the mine has been enlarged by the installation of a Sirocco fan with a capacity of 150,000 cubic feet of air a minute. During 1920 the production was increased from 72,885 tons in 1919 to 207,236 tons.

The East Wellington Coal Company is a new organization that has secured a lease on a royalty basis from the Canadian Collieries (Dunsmuir), Limited, of a tract of approximately 2,800 acres of land adjoining the old Jingle Pot mine and extending to the northward. This tract of land is for the most part virgin territory, presumably underlain by the Wellington coal-seam, but also includes the Old East Wellington mine, which it is proposed to unwater. Up to the present time the work being done consists of clearing 10 acres for mine buildings, driving a new slope 611 feet, counter-slope 86 feet, crosscuts 155 feet, sump 6 by 12 by 30 feet, and erecting buildings for the following mentioned machinery which has been installed under the supervision of John John, the mine manager: Two 60 by 16, 200-horse-power boilers installed and equipped; two compressors, one 14 by 18 C-2 and one 16 by 16 C-2, installed and equipped; one hoisting-engine at pit-mouth.

In addition the following surface work has been completed: All air and steam lines completed; one blacksmith-shop and equipment; one machine-shop; one oil-house; three air-receivers; water and air lines completed; one water-tank, 35,000-gallon capacity; 700 feet of

railway spur completed from main line to pit-mouth, also 1,200 feet of mine-tracks all completed; Main-slope, counter-slope, and crosscuts all completely timbered, approximately 50,000 feet of timber used; engine-house, boiler-house, and compressor-house all constructed; mine-fan of 5,000 feet capacity free air installed and equipped with pipes, etc., leading to and from same; water and air lines all completed to bottom of shaft.

The Jingle Pot mine, west of the Canadian Western Fuel Company's farm, which was owned and operated by the Vancouver-Nanaimo Coal Mining Company, Limited, from about 1907 until its reorganization, during the war, into the British Columbia Coal Mining Company, Limited, was closed down as worked out early in 1920, after having produced approximately 800,000 tons of coal from an area of about 70 acres. The seam of coal mined on this property is the Wellington or lowest seam in the Nanaimo coalfield.

The Old Wellington mine, which was first opened by the late Robert Dunsmuir in 1868, and laid the foundation to his fortune, has been leased by the Canadian Collieries (Dunsmuir), Limited, to Alfred G. King, Jr., and Edward R. Foster, of Nanaimo, who are reopening the old workings on the Nos. 2 and 3 mines, Old No. 1 slope, and Old adit. These operations were started about the end of 1920, when some coal was mined after the old workings had been examined and found in good condition, considering that they have been closed down since 1901. In these old workings there occurs the coal-seam known as the Little Wellington, which overlies the main Wellington seam in the extreme north-western part of the basin at a distance of 20 to 60 feet, and was mined at the Old No. 1 shaft at the Old Wellington Collieries, which is included in the lease secured by King & Foster.

Round Island.—It is reported that John Arbuthnot and associates, of Victoria, have secured bonds on Round island and submarine coal areas in that vicinity, and propose opening a colliery provided the prospecting-work now being done results satisfactorily. Round island is near the northerly island of the De Courcey group, a short distance south-easterly from Dodd narrows and about 8 miles in the same direction from the city of Nanaimo.

Full particulars relative to the details of the workings in the coal-mines are given in this Annual Report under the head of "Reports of the Inspectors of Coal-mines."

Metalliferous-mining Industry.

The Nanaimo Mining Division is the largest in area of the several Mining Divisions in the Western Mineral Survey District No. 6, but metalliferous mining during 1920 has not progressed in as marked a degree as could be desired. One reason for this lack of progress is the fact that a very large proportion of the Division lies within the Esquimalt & Nanaimo Railway Belt, or "Dunsmuir" concession, in which all of the coal and base metallic minerals are owned by the Esquimalt & Nanaimo Railway Company, while the precious metals only belong to the Crown. In consequence of this fact and the difficulty of securing any title to the minerals owned by the railway company, prospectors have little incentive to explore within the boundaries of the concession.

Operations in metalliferous mining on Vancouver island have in consequence been confined to the north-westerly portion of the Nanaimo Mining Division, outside the Railway Belt, and to the several islands lying between Vancouver island and the Mainland.

Strathcona Park Section.

Buttle Lake Subsection.

Paramount Mining Co.

From July 18th to 27th, 1920, the writer was occupied in making a trip to the head of Buttle lake, Strathcona Park, to examine the three groups of mineral claims on Myra and Price creeks, on which diamond-drilling and other prospecting-work was being carried on by the Paramount Mining Company under the superintendence of J. D. Tolman. This company was organized by Joseph Errington to acquire the *Lynx*, *Paw*, and *Shot* groups, comprising a total of forty mineral claims.

Area and Location.—The *Lynx* group contains fourteen mineral claims located on the northerly side of Myra creek, which flows into Buttle lake near its head. The *Paw* group contains eight mineral claims on the southerly side of the same creek. The claims in the two groups are staked in solid blocks, and the groups are connected by the *Bessie* mineral claim, which is staked from side to side of Myra creek, thus forming a connecting-link between the *West* and *South Paw* claims of the *Paw* group and the *Mink* and *Red Squirrel* claims of the

Lynx group. The *Shot* group contains eighteen mineral claims located on Price creek, and this group is separated from the *Paw* group by a high mountain divide which rises between Myra and Price creeks to an elevation of about 5,000 feet.

Geography.—The source of Price creek, which flows into the head or southerly end of Buttle lake, is in the easterly slope of the Beaufort range and a short distance northerly from Mount Septimus, altitude 6,300 feet.

The above-mentioned groups of mineral claims are reached from the Campbell River settlement on the east coast of Vancouver island, near the northern terminus of the Island Highway auto-road, and is a port of call for nearly all vessels sailing north from Vancouver. From Campbell river the route of travel to the head or south end of Buttle lake is via auto or wagon in a westerly direction to the foot of Upper Campbell lake, distant about 16 miles; thence by pack-trail in a southerly direction about 14 miles to the northerly end or foot of Buttle lake, where there is a good log cabin erected for the Government during the time when surveying and trail-building were in progress in Strathcona Park about 1912. From this end of the lake to Myra creek is about 22 miles, which distance must be travelled by boat or canoe. From the beach near the mouth of Myra creek the Paramount Mining Company has constructed a main pack-trail about 3 miles long to the camp on the *Lynx* group on the north side of Myra creek, also a branch trail about 1½ miles long from the main trail to the *Paw* group on the south side of the creek.

Geology.—The rock formation in the mountains adjacent to the northerly end of Buttle lake belongs to the series of Vancouver volcanics, but at Marble creek, a tributary emptying into the lake on the west side, about 9 miles from its foot or northerly end, there is a well-defined contact between the volcanic rocks and crystalline limestone which occurs to the south-east of the volcanics. Southerly from Marble creek and the belt of limestone the rocks appear to be mostly metamorphic, with belts or zones of considerable extent showing gneissoid structure.

Within the boundaries of the *Lynx* and *Paw* groups of mineral claims there occurs a zone of metamorphic schists, usually greenish in colour, and talcose. The schists are so extensive as to be 1,000 feet in width in places. The line of strike is north-west and the dip of the schistose structure is approximately vertical. The schist-zone also occurs on Price creek on the *Shot* group of mineral claims in a south-easterly direction from the *Paw* group. As the *Shot* group had only been staked a short time before the examination it was not visited.

Ore-deposits.—In the schist-zone there are innumerable narrow stringers of quartz, and where these are the most plentiful the minerals, chalcopyrite, pyrite, and occasionally crystals of zinc-blende, occur. In some open-cuts made for prospecting on the *Lynx* mineral claim on the north side of Myra creek a general sample moiled across 12 feet assayed: Gold, trace; silver, 1.2 oz.; copper, 1.75 per cent.

On the south side of Myra creek, on the *East Paw* mineral claim, the schist-zone has the same characteristics as on the *Lynx*. The zone on the *East Paw* mineral claim has been prospected by diamond-drilling across the mineralized part of the zone, and consequently the extent in width of that part of the zone is exposed by the cores from the several drill-holes. These show that the average width of mineralized schist, which may be termed the ledge material, where drilled at an angle of 45° is 253 feet, but where drilled by flat holes is 150 feet, and as the dip is practically vertical the flat holes would expose the true width more accurately than the inclined holes. No samples were taken of the drill-cores.

Development-work.—The Paramount Mining Company has had ten diamond-drill holes bored on the *East Paw* mineral claim, totalling 2,008 feet. In addition several open-cuts have been made, and on the *Lynx* group of mineral claims several open-cuts and prospect-trenches have been made. The main camp is on the *Lynx* claim, where a large log bunk-house and cook-house connected by a porch reaching the full width of the cabins, in Southern style, have been built, also a commodious office cabin. At the beach a good log cabin has been built for the packers and storing supplies. In addition to the trails already mentioned as built up Myra creek from the beach camp, there has also been a trail built up Price creek to the *Shot* group of mineral claims.

PHILLIPS ARM SECTION.

The Phillips Arm section of the Nanaimo Mining Division includes that part of the Division on the Mainland in the vicinity of Phillips and Frederick arms of Cardero channel, about 120

Eagle Talc & Mining Co., Sooke River, Victoria M.D.

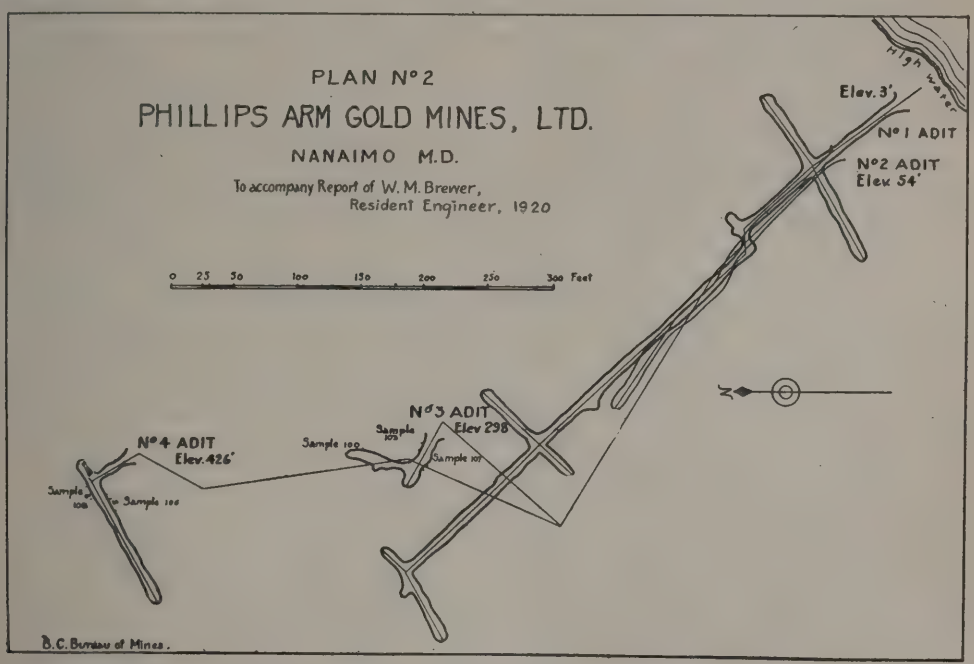
Emancipation Mine, Coquihalla River, Yale M.D.

miles north-westerly from Vancouver, as well as the country inland along Phillips river and vicinity.

During 1920 development-work was done on some of the mineral claims in the Phillips Arm section which have been idle for the past fifteen years or more. From September 1st to the 15th the writer's time was occupied in making examinations in this section, when he examined the *Red Cap*, *Amethyst*, *Blue Bell*, and *Alexandra* groups of mineral claims.

Red Cap Group. This group contains the *Magnet*, *Providence*, *Kitchener*, *Bermuda*, *Extension*, and *Neccotive* mineral claims, owned by the Thulin Bros., of Lund, and associates. The group of mineral claims is located on the East fork of Phillips river, about 20 miles by trail from the head of Phillips arm in a north-easterly direction.

Geography.—Phillips arm of Cardero channel penetrates into the Mainland for a distance of about 6 miles in a true north direction to the mouth of Phillips river, which flows from Phillips lake, situated about 3 miles up the river. The lake is about 4 miles long to the point where it becomes shallow from the filling-in of debris brought down from the upper part of Phillips river, which has its source in the high mountains of the Coast range, about 16 miles, as the crow flies, north-easterly from the head of the lake. Phillips river is not navigable even for a canoe, except under very favourable conditions, and for the most part flows through deep canyons.



The trail travelled to the *Red Cap* group of mineral claims follows the general course of Phillips river. The second lake is crossed by canoe or raft and a trail followed for about 5 miles up the Second East fork of Phillips river.

Geology.—The rock formations exposed along the route described above belong to the Coast Range batholith. No bands of metamorphosed argillites or other sedimentary rocks were seen until the upper reaches of the Second East fork of Phillips river were reached. There the occurrences of extensive areas of such rocks occur, enclosing wide veins of quartz sparingly mineralized so far as can be judged from samples taken during the examination.

Ore-deposits.—On the *Red Cap* group, on the northerly side of the Second East fork at about 2,500 feet elevation, the timber-line is reached, and above it the mountain-side is quite bare and precipitous. Here there occurs a wide belt of metamorphic argillites striking nearly east and enclosing several veins of quartz stained with iron oxides, on account of which the group of mineral claims was staked. Five samples taken from an adit crosscutting the formation assayed traces only in gold and silver and no copper.

Development-work.—The work consisted of the adit driven 142 feet across the metamorphosed argillites. Three cabins had been built by the owners of the *Red Cap* group—one at the head of Phillips lake, one at the crossing of the second lake, and the third on the mountain-side about 700 feet lower elevation than the adit.

Amethyst Group.

This group consists of two mineral claims known as the *Amethyst* and *Pathfinder*, owned by Thos. Golby and associates, of Victoria. The group was examined on September 11th, 1920, when the writer expected to meet Mr. Golby on the property, but unfortunately that gentleman had been called away on account of sickness, and the examination had to be made without the assistance of a guide conversant with either the surface or the underground workings, which was very unsatisfactory.

Geography.—The *Amethyst* group adjoins the old Crown-granted *Monte Cristo* mineral claim on the north side of Fanny bay, Phillips arm. The entrance to Fanny bay is on the west side of Phillips arm about 3 miles from Cardero channel. The property can be easily reached by launch or small boat from Shoal Bay, on Thurlow island, a port of call for several steamers plying from Vancouver, from which city it is distant about 120 miles.

Geology.—The *Amethyst* group of mineral claims, together with the *Monte Cristo* claim, occupy a zone made up of metamorphosed argillites, crystalline limestone, quartzites, schists, and shales, designated by Bancroft as "undifferentiated," which occurs as an inclusion in the granodiorite batholith of the Coast range. This belt of metamorphosed rocks is typical of many such occurrences along the mainland coast, and, as is usual in these zones, there are veins of quartz, mineralized with iron sulphides, gold, silver, and copper minerals. The formation has been intruded by several igneous dykes which generally occur in the limestone in the region of mineralization.

Ore-deposits.—The occurrence of ore was first discovered from outcroppings on the *Monte Cristo* claim about 1901, when some development-work was done. This was confined to open-cuts which appear to have exposed lenses of ore on either side of an igneous dyke. These lenses belong to the contact-metamorphic type of ore-deposits, occur irregularly, and are such that considerable time would be required to work out satisfactory conclusions. Apparently, judging from the work done, the lenses of ore were easily followed from the *Monte Cristo* claim on to the *Amethyst*, where the open-cut work was changed to driving adits, and the rock formation became much broken up, slickensided, and generally disturbed. There was no ore exposed in the face of either of the two adits examined, but there were indications that ore occurred in the floor of the lower adit. A sample taken from the dump at the portal of the No. 2 adit assayed: Gold, trace; silver, 2.4 oz.; copper, 3.5 per cent. This dump evidently represented the ore taken from the adit as the work progressed. A shaft that had evidently been sunk several years ago could not be examined on account of its dangerous condition.

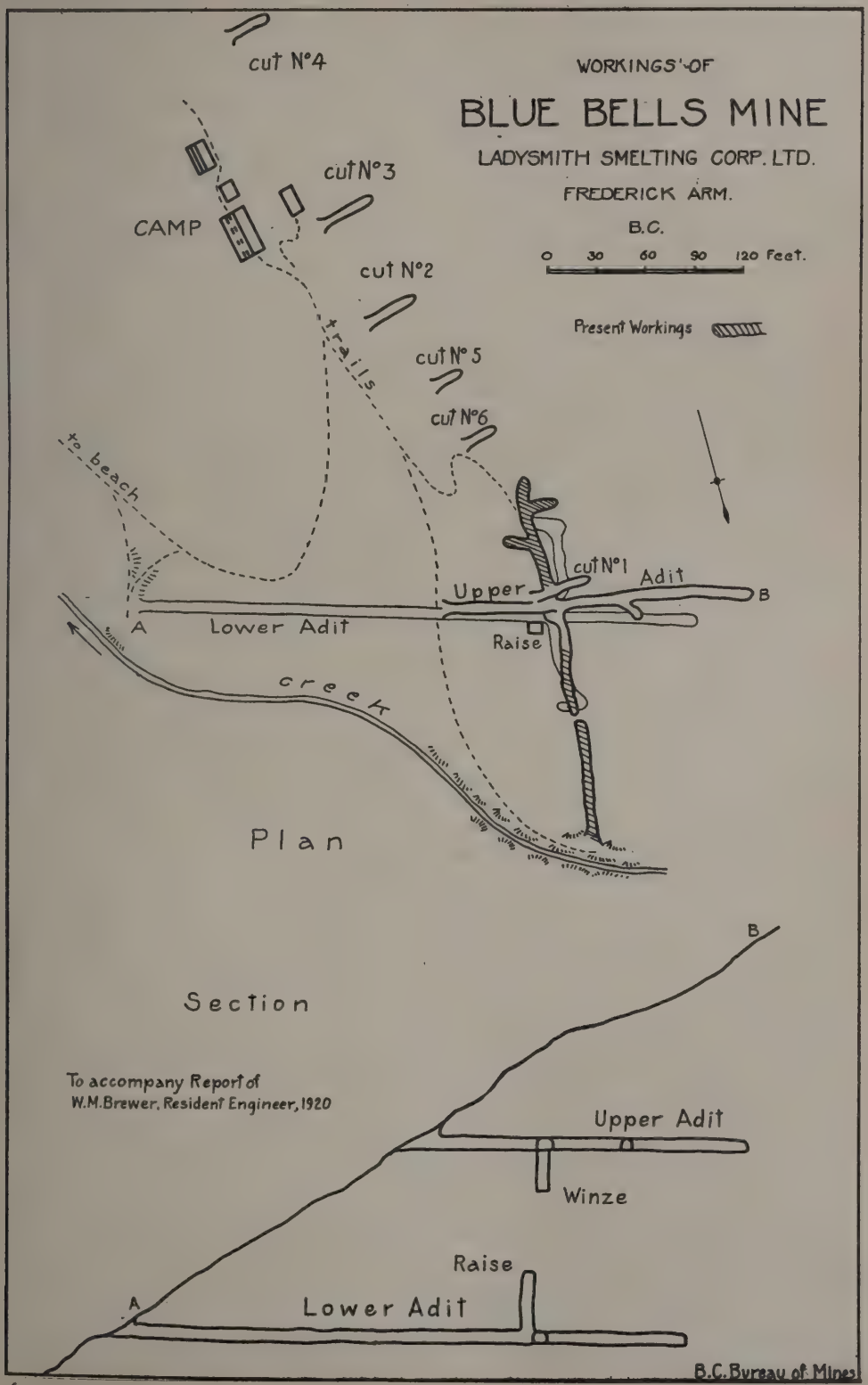
Development-work.—There are two adits each about 50 feet long; a deep open-cut made in benches, the lowest bench being from the entrance about 30 feet long and 18 feet deep; the next bench is about 9 feet above the floor of the lower one and is about 25 feet long; this is an approach to the No. 1 or lowest of the two adits, the other being about 20 feet higher. There is also an old shaft said to be about 30 feet deep, and there has been a connection made between the No. 2 adit and the west side of the shaft 18 feet below the surface.

Blue Bells Group.

This group consists of four mineral claims, named *Black Prince*, *Dashwood*, *Gold Bug*, and *Blue Bells*, containing 178.61 acres. The property was operated during 1920 by the Ladysmith Smelting Corporation, Limited, under the superintendence of R. F. Hill; the main object of the Smelter Company in securing this property being as a source of siliceous ore for fluxing. The group is located on the west shore of Frederick arm of Cardero channel. The boundaries of the mineral claims extend from the beach in a westerly direction in the order named above.

Geology.—The geologic formation on the *Blue Bells* group is made up of a zone of metamorphosed shale, schist, argillite, argillaceous limestone, tuff, and crystalline limestone, which form an inclusion in the Coast Range granodiorite batholith, and represents an example of a roof-pendant, as classified by the geologists, Daly, Camsell, and Bancroft, which was not destroyed at the time of the intrusion of the granodiorite nor removed by later erosion. The metamorphosed rocks are traversed by quartz veins.

Ore-deposits.—The occurrence of ore on the *Blue Bells* group is in a fissure filled with quartz carrying gold values, sometimes associated with iron pyrites, but usually on and near the surface as free gold in the quartz gangue. The quartz vein on the *Blue Bells* claim, on which all the


cut N°4
WORKINGS OF
BLUE BELLS MINE
LADYSMITH SMELTING CORP. LTD.
FREDERICK ARM.
B.C.
cut N°3
CAMP
0 30 60 90 120 Feet.
cut N°2
Present Workings
trails
cut N°5
cut N°6
to beach
cut N°1
Adit
Upper
B
A
Lower Adit
Raise
creek
Plan
B
Section
To accompany Report of
W.M. Brewer, Resident Engineer, 1920
Upper Adit
Winze
Raise
A
Lower Adit
B.C. Bureau of Mines

development-work has been done, has its line of strike about N. 35° W. and dips at an angle of 80° towards the south-west. It is exposed in both the upper and lower adits.

Development-work.—The mine-workings are about 5,000 feet from the beach at an elevation of 1,500 feet. The old workings date back from 1898–1902, but during 1920 these were reopened and extended. The camps at the beach and mine were rebuilt and the trail from the beach cleaned up and, where necessary, reconstructed.

The old workings consisted of six open-cuts and two crosscut adits, the upper one 75 feet below the apex of the outcrop and the lower one about 75 feet lower elevation. The upper adit is 190 feet long, with drifts driven 15 feet long to the north and 35 feet long to the south from a point 75 feet from portal of adit; also a winze sunk at the junction of the adit and north drift. The lower adit is 350 feet long, and at a point about 250 feet from the portal a raise is made to connect with the winze from the upper level. Drifts are driven, each about 50 feet long, to the north and south.

During 1920 five of the surface open-cuts were reopened; the drifts in the upper level were extended, the north drift 52 feet and south drift 45 feet; crosscuts were made from the south drift 17 feet to the east and 18 feet to the west. A new drift was driven 70 feet long on the upper level, with its portal in the steep bank of a creek about 150 feet northerly from the main adit. This drift is not yet connected with the north drift from the main adit.

Sampling.—The original workings were systematically sampled, as well as the new extensions by the Ladysmith Smelting Corporation, Limited. A total of about 200 samples, weighing from 10 to 90 lb. respectively, were taken during the operations, but the assay values have not been made public.

Alexandra. This is one of the oldest locations in the Phillips Arm section of the Nanaimo Mining Division and is owned by the Phillips Arm Gold Mines Company, Limited, of Vancouver. The mineral claim is situated on the Mainland at Picton point, at the entrance to Phillips arm of Cardero channel. The property is very easily reached by any of the Union Steamship Company's steamers that call at Shoal Bay on Thurlow island, and from there by launch, rowboat, or canoe. The distance from Shoal Bay is only about 3 miles. The mine-workings are ideally situated on the shore, being from about 3 to 54 feet above high-tide mark.

History.—The *Alexandra* mineral claim was located previous to 1898, when the *Dorotha Morton* and *Douglas Pine* mines were being operated. In the Annual Report for 1898 there is a short report on the *Alexandra* claim made by the Provincial Mineralogist, but since then no reference is made to the claim in any of the reports. During 1919 the old workings were cleaned out, resurveyed, and systematically sampled by Henry Rhodes, of Vancouver; a copy of his map is included in this report.

Geology.—The prevailing rocks in the neighbourhood of the *Alexandra* claim are igneous, but there also occurs wide belts of metamorphosed shales, schists, and argillites, found as inclusions in the Coast Range granodiorite batholith. The band of metamorphosed sedimentaries is much fissured and sheared, as well as being intruded by some igneous dykes which usually cut it nearly at right angles. The fissures are filled with quartz and crushed country-rock. The general line of strike of the quartz veins is north-westerly and they dip at steep angles.

Ore-deposits.—The occurrence of ore is confined to the quartz veins, and on the *Alexandra* claim there occurs a main vein, so to speak, which apparently extends from the shore-line on the *Alexandra* claim in a north-westerly direction into the Pembroke range of mountains, the summit of which reaches an altitude of about 4,000 feet above sea-level at a comparatively short distance from Picton point.

The ore occurring in the quartz vein is either in the form of free gold or else as iron pyrites carrying values in gold and silver. From a list of 108 assays made from samples taken systematically by Henry Rhodes from adits Nos. 1, 3, and 4, evidence is given of the variable values contained in the quartz, ranging from about $25 a ton in gold and silver down to low values.

On account of the excess of silica in the vein or ledge, which is about 100 feet wide where it has been crosscut in two places in the underground workings, the property has become attractive to smelters as a source of fluxing-ore.

Development-work.—This consists of four adits; Nos. 1, 3, and 4 are driven as drifts along the quartz vein, while No. 2 is driven parallel to the vein in barren material with the idea of using it as a main haulage-adit whenever the property is worked on a commercial scale.

Adit No. 1 is driven from the shore about 3 feet above high-water mark; it is about 530 feet long, with three crosscuts, each about 100 feet long—one about 90 feet from the portal, the second 380 feet from the portal, and the third at the face of adit. Adit No. 2 is about 50 feet elevation above No. 1 and is about 260 feet long. Adit No. 3 is at an elevation of 298 feet above sea-level and is about 100 feet long. Adit No. 4 is at an elevation of 426 feet above sea-level and is about 150 feet long.

Lasqueti Island Section.

Lasqueti is a small island about 12 miles long by 4 miles wide in the strait of Georgia about 18 miles northerly from Nanaimo. It is in the Nanaimo Mining Division, and although there are not any regular ports of call on the schedules of either the Canadian Pacific or the Union Steamship Companies, the island is easily reached by launch from Nanaimo or Union Bay.

Venus Group.

This group contains nine mineral claims and one fraction, called the *Mars*, *Venus*, *Venus Fraction*, *Hill 60*, *Big Dipper*, *Joan of Arc*, *L.S.*, *St. George*, *Blue Bird*, and *Reliance*. The group is owned by the Lasqueti Mining Company, Limited, of which Henry Lee is the managing director; office, Room 708 Birks Building, Vancouver. The property was examined on November 11th and 12th, 1920, by the writer in company with Mr. Lee, when mining had only been carried on for a short time.

Location.—The *Venus* group is staked from a small bay near the north-westerly end of Lasqueti island, with the north boundary of the *Mars* claim along the shore-line. The *Venus* claim is adjoining and south of the *Mars*, with the *Venus Fraction* adjoining it on the east and *Hill 60* adjoining the *Venus Fraction* on the east. The remainder of the mineral claims in the group are located in a solid block, two claims wide, southerly from the *Venus* and *Hill 60*, with their northerly boundary adjoining the southerly boundary of the two last-named claims.

Geology.—The rock formations on the *Venus* group are diorite porphyry and diorite with a basaltic phase. The diorite porphyry is apparently more recent than the diorite and occurs as an intrusion in the diorite, with the contact well defined, although there are several faults observable along the strike, which is in a general way in a N. 25° E. direction.

Ore-deposit.—A body of sulphide ore occurs in the *Mars* and *Venus* claims, carrying gold-silver-copper values, at or close to the contact of diorite porphyry with diorite, and is exposed on the beach near the mouth of a small creek. This vein is from 3 to 4 feet wide where it is exposed in a drift-adit about 100 feet long. The diorite porphyry is the hanging-wall and the dip of the ore is about 85° to the west. Samples taken from the dump representing shipping-ore assayed: Gold, 0.60 oz.; silver, 3.5 oz. a ton; copper, 17.2 per cent.; and: Gold, 0.38 oz.; silver, 1.8 oz. a ton; copper, 14.4 per cent.

On the surface it is shown by open-cut prospecting that the ore-body possibly extends for about 2,000 feet along the strike, with the peculiarity that there are no natural outcrops of ore exposed, and the only successful method of prospecting is by finding first the contact between the diorite porphyry and diorite and then making open-cuts and trenches.

On the *Hill 60* claim there is exposed by open-cuts a body of ore that appears to occur on a contact nearly parallel to that on the *Venus* claim. There is a possibility that the ore-deposit on the *Hill 60* claim may, if continuity is maintained in a south-westerly direction, intersect the *Venus* ore-body.

At the time the examination was made the writer was very favourably impressed by the systematic and businesslike manner in which the operations were being carried on. Previous to January 1st, 1921, a shipment of ore had been made to the Tacoma smelter for treatment.

Development-work.—This consists of a drift-adit about 100 feet long, with an upraise 20 feet high to within about 15 feet below the surface; also several deep open-cuts and considerable surface-stripping to locate the contact along the line of strike. A large log cabin for sleeping-quarters, a cook-house, office building, and blacksmith-shop, together with a building for compressor plant, comprise the mine camp proper.

St. Joseph Group.

This group, containing the *St. Joseph*, *St. Anthony*, and *Ajax* mineral claims, adjoins the *Mars* claim of the *Venus* group on the east. The group is owned by the Lasqueti Island Mining Company, of Vancouver. No work has been done on the *St. Joseph* group for about twelve years and the underground workings were not in such condition as to afford an opportunity for examination. A sample taken from a small dump of ore that had evidently been sorted assayed: Gold, 0.82 oz.; silver, 2.2 oz. to the ton; copper, 11.4 per cent.

Geology.—The rock formation on the *St. Joseph* group is apparently all diorite, which is very much sheared, and an ore-body occurs on the shore in the shear-zone in the diorite; this may possibly be an extension of that on *Hill 60* of the *Venus* group, for the reason that apparently the diorite-porphyry wedges out in a northerly direction from near its north boundary, and there are indications that the shear-zone in which the *Hill 60* ore occurs is continuous on to the *St. Anthony* claim to the north of and adjoining the *Hill 60*. The *St. Anthony* adjoins the *St. Joseph* on the south.

Development-work.—On the surface of the *St. Joseph* claim near the shore there has been very considerable cribbing-work done for dumpage purposes. There is a broken-down tramway, an ore-bunker built of logs, and cabins. It is reported that the underground workings consist of an adit 125 feet long, with an upraise 20 feet to the surface, and a winze of unknown depth from the adit, together with a drift from the bottom of the winze.

TATLAYOKO LAKE SECTION.

The Tatlayoko Lake section of the Nanaimo Mining Division includes all of that part of the Division on the Mainland which takes in the Klinaklini and Homathko rivers and Tatlayoko lake. This area makes up the northerly corner of the Division. At present this part of the Nanaimo Mining Division cannot be reached from the Coast unless the traveller is prepared to pack his supplies, etc., on his back through a practically unexplored country. The route now used is by wagon-road via the Fraser River valley to Alexis Creek, on the Chilcotin river. From Alexis Creek an automobile can be driven to the head of Tatlayoko lake, where a canoe can be used to reach the property of the Tatlayoko Gold Mines Company, Limited. In order to reach the headwaters of the Klinaklini and Homathko rivers pack and saddle horses can be used from the head of Tatlayoko lake.

The Tatlayoko Gold Mines Company, Limited, was operating its property near the outlet of Tatlayoko lake, and J. T. Morris, the manager, states that it is the intention of the company to instal a concentrating-mill during 1921.

During the summer of 1910 the Provincial Mineralogist visited the Tatlayoko Lake section of the Nanaimo Mining Division, and made a report which was published in the Annual Report for that year, from which the following excerpts are taken:—

"I have just returned from an inspection of the properties held by A. H. Sheppard and associates on Tatlayoko lake, and find they have some eleven or twelve mineral claims divided into two groups which they call *Copper Camp* and the *Gold Camp*. These groups adjoin and are situated on the eastern side of the valley in which Tatlayoko lake lies, some 2 miles south of the southern end of the lake and directly opposite the pass by which the Homathko river—the outlet of the lake—breaks to the westward through the Coast range of mountains and flows to the south-west into the head of Bute inlet, a distance of from 50 to 75 miles.

"Tatlayoko lake is at an elevation of about 2,700 feet above sea-level, and the mineral claims referred to are at an altitude of 5,900 feet, or 3,200 feet higher than the lake.

"The *Gold* group, of which the principal claim is the *Tyee* mineral claim, lies at an altitude of 5,900 feet and above timber-line. The country-rock here is a network of dykes, mostly basic, frequently cut by more recent acid dykes; these dykes are so numerous as to completely obliterate most signs of the original sedimentary formation.

"Cutting through this network of dykes there was seen outcropping on the surface a quartz vein having a strike of about S. 20° E. and dipping to the east into the hill at an angle of 37°—very persistent in its course, but of variable width, varying from a few inches to several feet. I took a rough sample of this outcrop at one of the wide parts where it seemed to be most heavily mineralized, and find it to assay: Gold, 3.50 oz.; silver, $26 to the ton, being ore worth about $85 to the ton.

"Associated with this quartz vein, apparently in lenses lying alongside the vein, were considerable quantities of stibnite—sulphide of antimony—mixed with quartz. These lenses assayed about the same in gold as did the main vein, and such experiments as I have been able to make did not indicate any increased gold values with an increasing percentage of antimony, from which I argue that the gold value is not associated with the stibnite, although it seems probable that the silver values are so carried.

"To strike this outcrop at a depth, a crosscut tunnel has been run, S. 55° E., for 60 feet without cutting the vein; a raise was then put up from the tunnel for 18 feet and the vein was

found, being here about 12 inches wide. I sampled it at this point and found it to carry: Gold, 0.28 oz.; silver, 2.60 oz.; about $7 ore. The raise indicated that the tunnel was too far to the right, so a deflection was made to the left for 30 feet, when the vein was struck at the tunnel-level, and subsequently this vein has been drifted on for 20 feet, but the last 12 feet only of the tunnel might be considered as in commercial ore.

"At the face of the tunnel the whole drift was in ore and apparently had not disclosed the full width of the ore-body. What was considered the 'hanging-wall' was quartz, which I had sampled, and it assayed: Gold, $8; silver, 16 oz. to the ton; below this the vein was exposed for a width of 90 inches, which I sampled, in three parts of 30 inches each, and assayed, as follows:—

	Gold. Oz.	Silver. Oz.
30 inches, next hanging-wall	Trace	0.4
30 inches, middle of vein	0.14	1.0
30 inches, bottom of vein	0.20	30.4

"The lower 30 inches of the exposure in the face of the tunnel contains a considerable percentage of sulphide of antimony; this part of the vein continued into the floor of the tunnel for a depth not determined, so that the 30 inches sampled does not represent the full thickness of this grade of ore.

"These samples were certainly encouraging, but not as yet commercial ore in this locality, and not nearly up to the indications of the surface outcrops.

"At an elevation some 100 feet lower than the upper tunnel, a lower tunnel has been driven in on another quartz vein, which vein is from 6 to 12 inches in width, having a strike of about S. 55° E. (mag.) and a dip to the north-east of 35°. This vein was followed in by the tunnel for 105 feet, when another vein, having a strike S. 32° E. and a flatter dip, was encountered, and the tunnel was deflected to the left along this for 54 feet, when a further deflection was made to the left—to S. 32° W.—and the tunnel continued for 90 feet; in which latter portion it could not be seen that any vein was followed or cut. The quartz in this lower vein was sampled and assayed, and contained: Gold, 2.90 oz., and silver, $1.50 a ton; equivalent to about $59 to the ton.

"The property stands as a prospect upon which they have driven 12 feet on an ore-body, as indicating by assays, of increasing and as yet undetermined size.

"As to the geology of the district, the granite and other plutonic rocks forming the Coast Range mountains extend eastward as far as Tatlayoko lake; on the east side of this lake are the sedimentary rocks of the Interior, and along this contact there is a strong probability that productive mineral-deposits occur, particularly where the dykes from the main Coast upheaval have struck off into the sedimentaries. It is on this contact that the mineral locations of Portland canal, the Telkwa, and of Lillooet are found."

Chromium Creek.—During 1920 prospectors staked and recorded about thirty mineral claims on Chromium creek, a tributary of the Klinaklini river. These claims were staked, according to the statements made by the prospectors on their return, on account of the occurrence of deposits of iron ore.

The writer had arranged with J. T. Morris, the manager of the Tatlayoko Lake Gold Mines Company, Limited, to make a trip into this part of the Nanaimo Mining Division during 1920, but was unable to do so owing to the fact that other duties occupied the season until it was too late to attempt to make the trip and be assured of a good opportunity for examinations; consequently this trip was postponed until next July, when a thorough examination will be made of all the mineral prospects.

Texada Island Section.

Mining on Texada island during 1920 has not been as active as in past years; in fact, except that the annual assessment-work has been done on mineral claims that have not been Crown-granted, the record for the past year has been disappointing. It was anticipated early in the year that possibly the *Vananda* group of mineral claims, on which very active mining was done from 1898 to about 1906, would be acquired by the Tacoma Smelting Company and the old workings reopened, but apparently the negotiations failed.

Marble Bay.

For the first time since 1898 this mine failed to be a producer. Prospecting was carried on during the past year by diamond-drilling on and below the 1,700-foot level, but the problems as to the available tonnage that could be

extracted and the cost of extending the underground workings to make such extraction possible proved too difficult of solution, especially when the conditions of the copper market were considered; consequently the mine is idle at present.

Limestone-quarries. Texada island is fortunately situated with regard to the occurrence of very extensive deposits of limestone, usually highly crystalline and free from impurities, as well as being within a very short distance from deep-water transportation. Two quarries, one at Blubber bay, at the northerly end of the island, owned by the Pacific Lime Company, and the other at Stuart or Marble bay, owned by the Tacoma Steel Company, have been operated during 1920. The former shipped 196,312 barrels of burnt lime and 2,212 tons of lime rock for use in the paper-mills on the Coast; the latter shipped 4,655 tons of lime rock to the Powell River pulp and paper mills.

Redonda Island Section.

The deposits of magnetite on Redonda island were fully described in the Annual Report of the Minister of Mines for 1919, page 215. Since then no development other than the annual assessment-work has been done.

Limestone-quarries. Limestone-deposits occur on Redonda island close to the shore of Pryce channel and a short distance easterly from the group of mineral claims owned by the Redonda Iron-Copper Company, Limited. The limestone is highly crystalline and occurs in contact with the hornblendic granitic rocks which for the most part make up the rock formation on the northerly portion of the island, where the limestone occurs. During 1920 the limestone-quarries were operated by the Nickson Construction Company, Limited, when 8,450 tons of limestone rock was mined and shipped to the Whalen pulp and paper mills.

Quadra Island Section.

There was little activity in the mining industry on Quadra island during 1920. The usual assessment-work was done on mineral claims that have not been Crown-granted and some prospecting was carried on by the local pioneer prospectors.

Ingersoll Group. No copper ore was produced from this group of mineral claims, owned by the Valdes Island Copper Mining Company, during 1920. This was contrary to the expectations of the officials of the company, and was owing to the fact that the necessary capital required for further development-work could not be obtained.

Wanderer Group. This group of mineral claims contains the *Wanderer* and *Prospector*, owned by Ross & Hamilton, for whom Wm. Law, of Hyacinthe Bay, Quadra Island, is agent. The group is situated in the north-westerly part of Quadra island, about 1¼ miles in a north-easterly direction from Deep Water bay, Discovery passage. The *Wanderer* group was originally staked and recorded as the *Ajax* group and was partially developed several years since by T. J. Vaughan Rhys, but was later abandoned.

Geology.—The prevailing rock formation in the vicinity of the *Wanderer* group of mineral claims is the granodiorite of the Coast Range batholith, but southerly from that group there occurs a wide belt of limestone, which is regarded as belonging to the Marble Bay formation by J. Austen Bancroft in his Memoir No. 23, "Geology of the Coast and Islands," Canada Department of Mines, 1913. This belt of limestone extends nearly across Quadra island from Open bay on the easterly side to near Granite bay on the westerly side.

Ore-deposits.—On the *Wanderer* group of mineral claims, as well as on other claims in the neighbourhood, are occurrences of lenticular ore-deposits containing magnetite, pyrite, pyrrhotite, chalcopyrite, and some tetrahedrite or grey-copper. The ore-deposits may be considered as belonging to the contact-metamorphic type, although they occur some little distance from the actual line of contact between the granodiorite and limestone. The main ore-body has a width of about 50 feet, with its length unknown. This is a low-grade copper-sulphide ore which contains some lenses or shoots of higher-grade ore, presumably tetrahedrite.

Development-work.—This consists of an adit about 100 feet long, in addition to considerable surface-stripping.

Gabriola Island Section.

Gabriola island is in the strait of Georgia a short distance easterly from the town of Nanaimo. The only work of a mining character carried on in this island is that of quarrying shale for the manufacture of red brick.

Gabriola Shale Products Co.—This company's brick-making plant is on the westerly side of Gabriola island near False narrows. The quarries from which the shale used for brick-making comes are near the shore-line close to the plant. During 1920 the company manufactured 3,578,600 red brick for building purposes. The chief market for this product is the city of Vancouver, to which the brick are transported by scows. The near proximity of the quarry and plant to shipping facilities is extremely advantageous and enables the company to operate at a minimum cost.

VANCOUVER MINING DIVISION.

The conditions in the mining industry in the Vancouver Mining Division during 1920 have been fairly satisfactory, at least until the latter end of November, when the bottom dropped out of the copper market and the *Britannia* mine temporarily suspended production. As this has been the only producing mine in the Division during 1920, the temporary suspension is a serious blow at this time.

During 1920 J. W. D. Moodie resigned as general manager of the Britannia Mining and Smelting Company, Limited, and was succeeded by E. J. Donohue, who had been secretary-treasurer of the company for several years past. The position of secretary-treasurer is being filled by G. E. Nettleton.

In addition to the operations carried on by the Britannia Mining and Smelting Company, Limited, during 1920, there has been development-work of a more or less extensive nature carried on at four other points on Howe sound, viz.: On the *Horseshoe* group of mineral claims on McDonald creek, on the westerly side of Howe sound, nearly opposite Britannia Beach; on the *Opporgol* group of mineral claims on Howe sound, about 5 miles from Whytecliff, the present terminus of the North Vancouver branch of the Pacific Great Eastern Railway; on the *Bowena* group of mineral claims on the south-easterly corner of Bowen island; and on the *Attorney* group of mineral claims near Alberta bay, Howe sound.

Other development-work done in the Vancouver Mining Division during 1920 is on the *Copper* group of mineral claims on Treasure mountain, Jervis inlet; on the *Lillie* group of mineral claims near Mount Diadem, on the westerly side of Jervis Inlet; on the *Sun* group of mineral claims near the head of Seymour creek; on the *Iron King* and other groups of mineral claims on the Pacific Great Eastern Railway near Alta lake; and on the *Radiant* and *Bruce* groups of mineral claims near the Stawamus river.

Prospecting for oil has been continued in an energetic manner near Burnaby lake by the Spartan Oil Company, which installed a standard drilling-rig that bores a hole 15 inches in diameter, and on December 1st last had reached a depth of 1,300 feet.

Prospecting for metalliferous minerals was carried on during the past summer in the mountains adjacent to both sides of Jervis inlet, also near the heads of Narrows and Salmon arms of Seechelt inlet and on the Tyzoone river, which empties into Narrows arm at its head.

Britannia.

For convenience this mine is now subdivided into five sections, known as the *Bluff*, *Fairview*, *Jane*, *Empress*, and *Victoria*. The last named has been prospected and opened up only since late in 1919. It is estimated that there is about 4,000,000 tons of copper-sulphide ore of commercial grade available in the *Victoria* section so far as is known to date, in addition to about 10,000,000 tons in other sections of the mine.

The *Britannia* mine retains its position as the most important copper-mining property not only in the Vancouver Mining Division, but in the Province, and during 1920 all of the copper-gold-silver production from this Mining Division came from the glory-hole and stopes above the 1,800-foot level in that mine. During 1920 the production from the *Britannia* mine of copper, silver, and gold shows a substantial increase over the production for 1919, notwithstanding the low price of copper since early in November last. The concentrating-mill at Britannia Beach was closed down on November 30th and the pay-roll of the company reduced to about 40 per cent. of the ordinary amount. At present the Britannia Mining and Smelting Company is carrying on development-work only in the mine, from which a small tonnage of ore is taken out during

that development-work. This ore is being brought to the stock-piles at the mill on the beach by the aerial tramway and electric railway, the incline tramway being tied up for the winter. The only work being carried on at the beach since November 30th last is continuing the raise from the main adit known as the 4,100-foot level. This adit is driven at an elevation of about 200 feet above high water, with its portal at a slightly higher elevation than the grizzly floor at the top of the mill. This adit is about 4,000 feet long, 9 feet high, and 13 feet wide, and is being driven to be utilized eventually as the main haulage-adit for the transportation of ore from the upper levels of the mine to the concentrating-mill.

Development-work.—During 1920 considerable development-work was completed in the *Bluff* section on the 1,400- and 1,600-foot levels, opening up the ore-body on those levels preparatory for actual stoping. On the 1,800-foot level a crosscut is being driven towards the *Bluff* ore-deposit from the main No. 1 shaft. In order to economize in handling the ore from the *Bluff* glory-hole a main transfer raise has been made, so that in future ore will be delivered to the underground crushers with one handling.

The No. 6 vein or ore-body in the *Fairview* section, which previously had only been exposed to the depth of the 1,200-foot level, or about 3,100 feet above sea-level, was developed down to the 1,600-foot level.

In the *Empress* section, easterly from the *Fairview*, development-work by crosscuts has been done on the 1,600-foot level and a raise is being driven to connect this level with the 1,200- and 1,000-foot levels above.

In the *Victoria* section, easterly from the *Empress*, an ore-body is being prospected on the 1,900-foot level by two adits, as well as by diamond-drilling on the 1,800-foot level.

The diamond-drilling done during 1920 is as follows: On the 1,000-foot level, 1,563 feet; on the 1,200-foot level, 728 feet; on the 1,600-foot level, 1,025 feet; on the 1,800-foot level, 2,380 feet; total, 5,696 feet.

The development in working-openings in the mine was extended during the past year as follows: Raises, 1,454 feet; drifts, 2,825 feet; crosscuts, 2,208 feet; chutes, 1,094 feet; total, 7,581 feet.

Among the improvements outside of the mine during 1920 were the construction of a new blacksmith-shop at the portal of the 2,200-foot level adit, following the abandonment of the older shop on the 1,000-foot level, and the addition of two 6-ton Exide Cell storage-battery locomotives to the previous equipment of twelve 3½-ton ones. That the installation of an Armstrong Shuveloader to assist the shovelling operations has proved very satisfactory is the report of Mr. Donohue.

The output for 1920 is as follows: Tons of ore mined, 697,897. Contents of product shipped: Gold, 6,013 oz.; silver, 90,672 oz.; copper after deducting slag loss, 16,201,266 lb.

Oppergol Group. This group contains sixteen mineral claims on the east side of Howe sound, about 5 miles north of Whytecliff Station, the terminus of the North Vancouver branch of the Pacific Great Eastern Railway. The group is owned by the Oppergol Mines, Limited, of Vancouver; W. Thomas Newman, manager. The property was examined by the writer on October 29th, 1920.

Area and Accessibility.—The area comprised in the *Oppergol* group of mineral claims is approximately 800 acres. The claims are staked two tiers deep along the east shore of Howe sound from south to north for a distance of about 2½ miles. The survey-line of the Pacific Great Eastern Railway from North Vancouver is along the entire length of the property from south to north. There are several points along the length of water-front well adapted for the erection of wharves and bunkers in sheltered waters.

The *Oppergol* group of mineral claims is easily reached from Vancouver by travelling on the Pacific Great Eastern Railway from North Vancouver to Whytecliff, and from there by launch or rowboat 5 miles to the camp on the shore on the *Cal* claim, one of the group.

Geology.—The geologic formations on the *Oppergol* group are somewhat similar to those in the Britannia belt, which are reported on by S. J. Schofield in the Geological Survey Summary Report for 1918, and of which he says in part: "The Britannia sills and the Britannia formation, which may be considered as a unit, since they were affected by the same geological processes, are surrounded and underlain at some depth by granodiorite of the Coast Range batholith. This great batholith extends from the International Boundary-line on the south in a north-westerly

direction to Alaska. The main mass holds many inclusions of all sizes which are termed roof pendants or roof remnants and are more or less mineralized."

The conditions on the *Opporgol* group differ from those in the Britannia belt in respect to the extent of the mineralized zone, which is apparently very much less than in the Britannia, also in the fact that the schists which occur so prominently in the Britannia only occur on the *Opporgol* group in narrow bands. There are undoubtedly shear-zones on the *Opporgol* group which can be traced for some distance in a north-easterly direction from the shore of Howe sound. Beds of conglomerate occur within the boundaries of the shear-zones, but the prevailing country-rock is diorite porphyrite, in which occurs a system of fissuring, the fissuring varying very much in width, from a few inches to 3 or 4 feet.

Ore-deposits.—There is a remarkable absence of outcropping indicating the occurrence of ore-deposits on the *Opporgol* group of mineral claims, and it was only by persistent prospecting and faith that the geologic conditions were favourable for the deposition of ore that discoveries of copper-sulphide ore were made by W. Thos. Newman at an elevation of about 1,050 feet above sea-level in a deep canyon. From this point observations were made and followed down the mountain to a point about 30 feet above the shore-line, where some conglomerate occurs, and indications of fissuring being noted, a drift-adit known as "Zero" adit was driven 150 feet in a N. 40° E. magnetic course, which is the strike of the fissure. This adit follows a narrow persistent fracture, which dips about 80° to the north, with enlarged width in places for about 90 feet, beyond which the fissure varies from a few inches to 18 inches in width, with but little indication of the occurrence of ore in the roof or face. A sample from the face assayed: Gold, trace; silver, trace; copper, 0.2 per cent. Another sample taken about 70 feet from the portal of the adit, near the floor, on the hanging-wall side, assayed: Gold, trace; silver, 5.1 oz.; copper, 13.5 per cent. A sample of some ore on the dump at the portal of the adit assayed: Gold, trace; silver, 1.0 oz.; copper, 3.5 per cent.

About 400 feet in a southerly direction from the adit mentioned, and at an elevation of about 110 feet above sea-level, some conglomerate occurs, also another fissure which strikes nearly parallel to the fissure in the "Zero" adit. At this point a drift-adit has been driven 150 feet on the strike of the fissure, which varies from a few inches to 3 feet in width. A sample of sorted ore on the dump at the portal of the adit assayed: Gold, trace; silver, 5.4 oz.; copper, 4.8 per cent. The ore in both of the adits appears to occur irregularly in the fissures as lenses.

Development-work.—This consists of a crosscut adit 48 feet long at an elevation of 1,050 feet above sea-level, also a short drift from the crosscut; some open-cuts at a point about 150 feet lower than the crosscut adit; drift-adit known as "Zero" adit, 150 feet long; and the No. 2 drift adit, 150 feet long, at an elevation of 110 feet above sea-level. In addition to this work there has also been a very considerable time occupied in geological research-work and general prospecting.

Transportation.—The *Opporgol* group is admirably located with regard to transportation, for the reason that only a short tramway is necessary to connect the "Zero" adit with the shore, where bunkers and wharf can be erected and where vessels can lie at all seasons in safety.

During 1920, in addition to the operations already described, there has been development-work of a more or less extensive nature carried on at three other points on Howe sound, viz.: On the *Horseshoe* group of mineral claims on McDonald creek, on the westerly side of Howe sound nearly opposite Britannia Beach; on the *Bowena* group of mineral claims on the south-easterly corner of Bowen island; and on the *Attorney* group of mineral claims near Alberta bay, Howe sound.

Other development-work done in the Vancouver Mining Division during 1920 is on the *Copper* group of mineral claims on Treasure mountain, Jervis inlet; on the *Lillie* group of mineral claims near Mount Diadem, on the westerly side of Jervis inlet; on the *Sun* group of mineral claims near the head of Seymour creek; on the *Iron King* and other groups of mineral claims near the Stawamus river.

Prospecting for oil has been continued in an energetic manner near Burnaby lake by the Spartan Oil Company, which installed a standard drilling-rig that bores a hole 15 inches in diameter, and on December 1st last it had reached a depth of 1,300 feet.

Prospecting for metalliferous minerals was carried on during the past summer in the mountains adjacent to both sides of Jervis inlet, also near the heads of Narrows and Salmon arms of Seechelt inlet, and on the Tyzoone river, which empties into Narrows arm at its head.

Copper Group. A full description of the *Copper* group of mineral claims on Treasure mountain, Jervis inlet, was published in the Annual Report of the Minister of Mines for 1917, page 283. Since then the development-work has been extended each year, resulting in exposing greater quantities of low-grade copper-sulphide ore associated with magnetite. It is considered unnecessary here to repeat the description made in the report referred to.

A good cabin was built near the mining-work in 1918; previous to then the miners had camped on the beach about 1½ miles from the workings.

NEW WESTMINSTER MINING DIVISION.

There has not been as much activity in the mining industry in the New Westminster Mining Division during 1920 as was anticipated would be the case at the beginning of that year, when it was considered probable that the *Lucky Four* group of mineral claims in the Cheam range of mountains, about 20 miles easterly from the town of Chilliwack, would be acquired by one of the leading copper-mining corporations of the United States. These negotiations, however, were not consummated and the property remained idle during the past year.

Some activity was noticeable in the Fire Mountain section of the Mining Division, near the head of Harrison lake, where some development-work was done in 1898 on the *Money Spinner* group, and a Huntington mill was erected on the property for treatment of the free-milling gold-bearing ore found at and near the surface. Operations were suspended during the same year and until during the past summer the camp has remained idle.

During 1920 a syndicate formed in Vancouver began to systematically prospect the *Money Spinner* group, as well as some of the abandoned mineral claims in the neighbourhood of that property, with a view of doing further development-work, provided prospecting resulted satisfactorily. As it was proposed to continue the prospecting during the winter of 1920–21, no report had been received to date.

Some prospecting was carried on in the Chilliwack Lake section of the New Westminster Mining Division, which it is the intention of the writer to visit during 1921 and make an examination of any mineral claims recorded.

Practically the only activity in the mining industry in the New Westminster Mining Division during 1920 was around Clayburn and Kilgard, near the Seattle branch of the Canadian Pacific Railway, where the Clayburn Company, Limited, is engaged in mining the Tertiary shales and clays for making brick, sewer-pipe, and firebrick. During the past year the Clayburn Company acquired the shale-deposits on the south-east side of Sumas mountain, known as the Kilgard deposits, and has been carrying on extensive operations continuously.

A very full description of these shale and clay deposits is contained in Memoir 24E, pages 125–138, Canada Department of Mines, 1912, "Preliminary Report on the Clay and Shale Deposits of the Western Provinces," by Heinrich Ries and Joseph Keele.

VICTORIA MINING DIVISION.

Continuous development on some of the groups of mineral claims in the Victoria Mining Division has marked the progress of the mining industry during 1920 in that Division, but there have been only a few prospectors in the field and no new discoveries of a spectacular nature have been reported.

The most important development-work carried on during 1920 has been done in the Jordan River, Leech River, Mount Sicker, and Saltspring Island sections of the district.

JORDAN RIVER SECTION.

Sunloch Group. In the Annual Report of the Minister of Mines for 1917, pages 265–267; 1918, pages 300–303; and 1919, page 235, this group of mineral claims was reported on very fully; consequently in the present report the development during 1920 only will be mentioned. Prospecting carried on during the past season resulted in the staking of seven additional mineral claims, so that the Sunloch Mines Company, Limited, now owns thirty mineral claims and fractions having an area of approximately 1,300 acres.

The development-work during 1920 consisted of 1,802 feet of diamond-drilling and 995 feet of crosscutting and drifting, making the total work done on the *Sunloch* group of claims 3,470.5

feet of diamond-drilling and 3,776.3 feet of crosscutting and drifting. Most of the work done during 1920 was on the west side of the Jordan river in exploring for an extension of the River zone on that side of the river. Diamond-drilling demonstrated the downward continuation of the ore in that zone to a depth of 150 feet below the mine-workings.

Operations were suspended in October last and a caretaker left at the mine. This action was owing to the unsatisfactory condition of the copper market, as well as the high cost for labour, supplies, etc.

Early in 1920 it was anticipated that a concentrating plant would be erected on the *Sunloch* property, but owing to the high price of machinery and unsatisfactory conditions with regard to contracting for delivery, as well as the excessive cost for construction material, it was deemed advisable by the management to postpone the programme for completion of arrangements to place the property on a producing basis.

J. A. Hanna, who had been superintendent since the organization of the company, resigned on May 31st, and was succeeded by Geo. H. Kilbourne, one of the mining engineers on the staff of the Consolidated Mining and Smelting Company of Canada, who has been engaged most of the time since 1917 in studying the ore occurrences and geologic conditions on Vancouver island and the mainland coast for that company.

Gabbro Group.

There are twenty-three mineral claims and fractions in this group, named as follows: *Vulcan Nos. 1* to *6*, *Black Hornet*, *Yellow Jacket*, *Adaline*, *War Eagle*, *Mud Wasp*, *Queen Bee*, *Viking Nos. 1* to *4*, *Lucky Bunch*, *Bee Fraction*, *Hornet Fraction*, *Cliff Fraction*, *Vulcan Fraction*, *Gabbro*, and *Gabbro Fraction*. The group is owned by the Gabbro Copper Mines, Limited, of Victoria; head office, Sayward Building; George E. Winkler, managing director.

Location.—The *Gabbro* group is situated on both sides of the Jordan river, adjoining the *Sunloch* group on the south-west, and is staked in a solid block, approximately 10,000 feet in length, from south-east to north-west, and averaging about 4,000 feet in width from south-west to north-east. All of the mineral claims in the *Gabbro* group, except the *Gabbro*, *Gabbro Fraction*, *Vulcan Nos. 3*, *4*, and a part of *No. 2* and *Vulcan Fraction*, are on the westerly side of the Jordan river. The narrow-gauge tramway (on the easterly side of the river) of the Sunloch Mines, Limited, traverses the *Vulcan Nos. 2* and *4* mineral claims of the *Gabbro* group.

Geology.—The rock formations which prevail on the *Gabbro* group are similar in a general way to those on the *Sunloch* group, being classified by Clapp in his Memoir No. 13, "Southern Vancouver Island," Canada Department of Mines, 1912, as Metchosin volcanics made up of ophitic basalt flows, tuffs, and agglomerates, with intrusive diabase dykes; less metamorphosed than the Vancouver volcanics and not intruded by batholitic bodies, except of the Sooke Gabbro group.

Ore-deposits.—The occurrences of outcroppings of copper-sulphide ore occur along zones somewhat similar to the occurrences on the *Sunloch* group. As an example, the Cave ore-zone which has been developed on the *Sunloch* group should, if it maintains continuity along its line of strike, be found on the *Gabbro* group on the *Gabbro* mineral claim south-east of the *Sunloch No. 2* claim on that side of the Jordan river, also on the *Vulcan No. 6* claim west of the *Sunloch No. 5* claim on the westerly side of the river.

Other ore-bearing zones which have been partially developed on the *Gabbro* group are known as: Archibald zone, an apparent continuation of the Archibald ore-zone which occurs on the *Sunloch* property; also the Winkler and Turnbull ore-zones. The former is being developed on the *Vulcan No. 2* claim on the easterly side of the Jordan river, and the latter is being developed on the *Yellow Jacket* claim on the westerly side of the river on Sinn Fein creek, a tributary of the river.

Development-work.—The development-work on the *Gabbro* group consists principally of open-cuts and strippings for prospecting purposes, totalling several hundred feet in length. There are also two adits, one on the Winkler ore-zone 80 feet long, and another on the *Yellow Jacket* claim about 30 feet long.

Leech River Section.

During 1920 the Leech River section of the Victoria Mining Division has been brought into more prominence than it has occupied for several years past or since the era of placer-mining on Leech river. The reasons for the attention that has been paid to this section recently are:

First, because the completion of the Canadian National Railway has enabled that company to operate freight-trains, and consequently helped prospectors to haul in supplies to a main camp instead of being compelled to pack in on their backs; second, because of the operations by W. G. Dickenson, of Victoria, who has been mining talc on Wolf creek, about half a mile from the track of the Canadian National Railway, and shipping to his factory at Sidney, near Victoria, where the talc is prepared for the market.

Eagle. This mineral claim is owned by W. G. Dickenson, of Victoria, who has been operating it in mining a deposit of talc since early in 1919. The claim is situated about half a mile up Wolf creek from its confluence with the Sooke river and nearly directly across that river from the mouth of Leech river.

Geology.—The prevailing rocks on the *Eagle* claim and vicinity belong to the Leech River formation as classified by Clapp in Memoir No. 13, "Southern Vancouver Island." He describes the formation as a belt of slaty schistose rocks, probably the oldest on Vancouver island, possibly belonging to the Carboniferous period. The belt occupies a considerable area of Vancouver island, as it extends across the island from Goldstream river to Port Renfrew, on the west coast at the mouth of San Juan river, increasing in width towards the west, where it attains a width of approximately 10 miles, but is only about 3 miles wide in the vicinity of Wolf creek. The Leech River schists and slates have been attractive rocks to prospectors in search of gold-bearing quartz veins, because these schists and slates contain innumerable veins and veinlets, which were the source of the placer gold formed in the streams which either crosscut the belt or traverse it for varying distances, but Mr. Dickenson is the pioneer in the talc-mining industry.

Mineral-deposits.—In several places in the Leech River formation there occur deposits of talcose slates, but the occurrence of a deposit of talc of sufficient purity and desirable colour as is found on the *Eagle* mineral claim is rare. The extent of the deposit has not yet been fully determined, although the development-work has been extended very considerably since 1919, when the property was examined, and reported on in the Annual Report for 1919, pages 240, 241.

Manufacturing Plant.—The plant for preparing the talc for market is at Sidney, on the Saanich peninsula, about 20 miles from Victoria. This consists of a rock-crusher and hammer-bar grinder, by which about 30 per cent. of the crude material is crushed to 200-mesh for use as a pigment for paints and an ingredient of some soaps; about 20 per cent. is crushed to 150 mesh for use in roofing preparation. The remainder of the material is treated in an old flour-mill, where it is ground between French Burrh millstones to powder between 100 and 200 mesh and the finest separated from the coarse by air from a fan.

A proportion of the talc as mined is well adapted for firebrick, as has been proven by experiments of a practical character.

MOUNT SICKER SECTION.

The Mount Sicker section of the Victoria Mining Division has not been the scene of much activity during 1920; in fact, except for some annual assessment-work, practically all of the prospecting-work done there has been by the Ladysmith Smelting Corporation. The section is badly handicapped at present on account of distance from railroad transportation, although the wagon-road from Duncan is in fair condition for automobile-travel by light cars. The Victoria Lumber Company, of Chemainus, continues to extend its logging-railroad along the Chemainus river, so that should any discoveries of importance lead to activity in the mining industry railroad transportation could be secured to connect with the Esquimalt & Nanaimo Railway at Chemainus, or cargoes of ore could be transferred there to ocean-going vessels.

Scotch Group. This group contains the following fourteen mineral claims and fractions, known as: *Victoria, Little Nugget, Seattle, Independence, Joy, Shakespear, Lynx, Belle, International, Alida, Chemainus, Dunsmuir, Little Bantam,* and *Alliance.* The group is situated on Mount Sicker, in the near vicinity of the *Tyee* mine.

During 1920 the Ladysmith Smelting Corporation had a small crew of miners working during the months of March, April, May, and June, reopening old workings and making open-cuts on the *Belle, Seattle,* and *Dunsmuir* mineral claims of the *Scotch* group. This work was prospecting rather than development, and when the work was suspended it was the intention of the company to resume during 1921 in the event of resumption of operations at the Ladysmith smelter.

ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

REPORT BY A. G. FREEZE, GOLD COMMISSIONER.

I have the honour to submit a brief annual report on mining in the Alberni Mining Division during the year ending December 31st, 1920.

Big I. Group.—This group of claims, situated about 10 miles by trail in a north-westerly direction from the head of Great Central lake, is held under bond by the Consolidated Mining and Smelting Company, Limited, of Trail, who during the year had a few men on the property, making a detailed survey of the surface of the mineral claims, also taking samples, and other work preparatory to diamond-drilling, which no doubt will be undertaken next year.

Monitor Group.—Nothing has been done on this group during the year.

The annual assessment-work has been done on a number of claims, but there have been no shipments from any of the mines in this district.

OFFICE STATISTICS—ALBERNI MINING DIVISION.

Mineral claims recorded	19
Certificates of work recorded	28
Free miners' certificates issued	27

Revenue.

Mining receipts, general	$223 75
Free miners' certificates	108 75
Total	$332 50

CLAYOQUOT MINING DIVISION.

REPORT BY J. F. JOHNSON, ACTING MINING RECORDER.

I have the honour to submit the annual report on mining operations in the Clayoquot Mining Division for the year ending December 31st, 1920.

Assessment-work recorded as follows:—

Colorado mineral claim, owned by W. F. Poole and T. T. Gardhouse, situated at Head bay, Nootka. Considerable stripping-work and open-cuts.

L. Grant and *Wanderer* mineral claims, owned by Lachlan Grant and situated at Kennedy lake. Digging ditch to drain tunnel 16 feet by 4 feet deep and 24 feet long, stripping 2 feet 8 inches on face of the tunnel, and other prospecting-work.

Lucky Jim mineral claim, owned by William Spittal and situated at Elk river. Tunnelling, 5 feet; open-cut, 8 feet by 4 feet by 16 feet; stripping and other prospecting-work.

White mine group, including the following mineral claims owned by William Walton and Duncan McMillan: *Norman*, *Dunlop*, *Walton*, *Alpha*, and *Douglas* mineral claims. All work was done on the *White* mine; over 18 feet by 4 feet 6 inches rock tunnelling and other prospecting-work. These claims are situated at Tofino creek, Tofino inlet.

Northern Crown mineral claim, situated at Clayoquot river and owned by J. E. Martin. Drove 18½ feet tunnel, also crosscut about 2 feet; took out about 4 tons of ore and other work.

V.I. No. 2 mineral claim, situated on Vargas island, Clayoquot sound, and owned by Dorothy Evelyn Abraham. Open-cut 15 by 5 feet. This claim is grouped with the *V.I.* mineral claim.

Lucky Jim mineral claim, situated at Bedwell river and owned by J. D. McLeod. Surface-trenching 18 feet long by 2 feet deep along the vein at the south-west line of the claim.

Ivanhoe and *Double Standard* mineral claims, situated at Muchalet arm, Nootka, and owned by William Wilson. Certificates of improvement have been granted and recorded, and Crown grants of these claims are likely to be applied for.

Gordon, Solar No. 1, and *Great Central No. 7.* Certificates of work were granted to Wilbur Johnston for each of these claims under authority of the "Allied Forces Act, 1918," and amendments thereto.

OFFICE STATISTICS—CLAYOQUOT MINING DIVISION.

Free miners' certificates (individual)	33
Mineral claims recorded	19
Certificates of work recorded	21
Transfers, etc., recorded	8
Other receipts issued	4

Revenue.

Mining receipts	$163 50
Free miners' certificates	147 75
Total	$311 25

QUATSINO MINING DIVISION.

REPORT BY ED. EVENSON, MINING RECORDER.

I have the honour to submit the annual report on the mining operations in the Quatsino Mining Division for the year ending December 31st, 1920.

Except the regular assessment and some development-work on the *Old Sport* group, no work has been done on mineral claims in the Quatsino Mining Division.

On the *Old Sport* group development-work has been vigorously carried on by the Coast Copper Company under the supervision of William Clancy. Some 1,500 feet of tunnel was driven for the purpose of developing the vein at a lower level; it is now in 2,100 feet. The tunnel is driven from foot-wall side and is 475 feet vertically below the outcrop, or 800 feet on the slope of the vein, which has a dip of 37°.

The only other work has been assessment-work; there has been no new construction.

On the *Millington* group, located at Spruce river near Holberg, a road was built into the mineral claims and considerable prospecting-work was done.

OFFICE STATISTICS—QUATSINO MINING DIVISION.

Free miners' certificates (individual)	57
Free miners' certificates (special)	1
Mineral claims recorded	42
Certificates of work	157
Powers of attorney, transfers, etc.	53
Total revenue	$909.00

Coalmont Colliery—Tipple.

Oppergol Mine, Howe Sound.

NANAIMO DISTRICT.

NANAIMO MINING DIVISION.

Report by S. McB. Smith, Gold Commissioner.

I have the honour to submit herewith the annual report on the mining operations in the Nanaimo Mining Division for the year ending December 31st, 1920.

There have been no shipments of ore from any of the metalliferous mineral claims in the Division during 1920.

Development-work with diamond-drills as well as by working-openings has been carried on at the *Marble Bay* mine on Texada island by the Tacoma Steel Company (D. C. Stephens, manager), and on the *Paw*, *Shot*, and *Cougar* groups of mineral claims on Myra and Price creeks, Strathcona Park, by Jos. Errington, manager of the Paramount Mining Company, of which J. D. Tolman is superintendent.

Development-work by working-openings only has been carried on at the *Blue Bells* group of mineral claims on Frederick arm, and the *Dawn* group on Thurlow island by the Ladysmith Smelting Corporation, Limited (R. F. Hill, superintendent of mining), and on the *Amethyst* group, Fanny bay, Phillips arm, by Thos. Golby, of Victoria, and associates. Near Tatlayoko lake the property of the Tatlayoko Gold Mines Company, Limited (J. T. Morris, manager), was developed more extensively and preparation made to build a concentrating-mill during 1921. On the *Venus* group, Lasqueti island, development-work was done and the construction of some large log buildings for camp purposes was finished early in December last; Henry Lee, M.E., Vancouver, is manager of the Vancouver syndicate which has bonded the claims.

Prospectors staked twenty-nine mineral claims in the extreme northerly part of the Nanaimo Mining Division on the Mainland, near the headwaters of the Klinaklini river.

Other popular portions of the Mining Division for prospectors in 1920, judging from the number of locations of mineral claims, were: Lasqueti island, with 38 locations; Powell lake, 41 locations; Texada island, 12 locations; Bute inlet, 14 locations; Quadra island, 5 locations; Rupert district in the vicinity of Kains and Quatse lakes, 14 locations; Maurelle island, 6 locations; Phillips arm, 8 locations; Cracroft island, 7 locations; Olson lake, 5 locations; Knight inlet, 6 locations; and near Ladysmith, 4 locations. There has been a total of 189 mineral claims located during 1920 in the Division, or sixty-seven more than in 1919.

Wm. M. Brewer, the Resident Engineer for the Western Mineral Survey District (No. 6), which includes the whole of the Nanaimo Mining Division, has examined many of the mineral claims on which development-work has been progressing during 1920, and will, I presume, give detailed descriptions in his annual report. Therefore it is only necessary for me to add the office statistics to this report, which are as follows:—

Office Statistics—Nanaimo Mining Division.

Mineral claims recorded	189
Certificates of work recorded	246
Bills of sale, etc., recorded	113
Free miners' certificates recorded	261

Revenue.

Free miners' certificates	$1,221 25
Mining receipts	3,036 65
Total	$4,257 90

VICTORIA DISTRICT.

VICTORIA MINING DIVISION.

REPORT BY HERBERT STANTON, GOLD COMMISSIONER.

I have the honour to submit the annual report on the mining operations in the Victoria Mining Division for the year ending December 31st, 1920.

As the Resident Engineer of the District, W. M. Brewer, has fully covered the mining activities of this Division for the past year, I will not attempt to further report on these matters, and beg to submit the office statistics of this Division for the year 1920.

OFFICE STATISTICS—VICTORIA MINING DIVISION.

Free miners' certificates issued	459
Free miners' certificates issued (special)	3
Mineral claims recorded	125
Placer claims recorded	1
Certificates of work recorded	107
Bills of sale recorded	15
Certificates of improvements issued	22

Revenue.

Free miners' certificates	$4,224 25
Mining receipts, general	781 81
Total	$5,006 06

VANCOUVER MINING DIVISION.

REPORT BY A. P. GRANT, MINING RECORDER.

I have the honour to submit herewith the following report on the mining operations in the Vancouver Mining Division for the year ending December 31st, 1920:—

The following is a list of the number of claims located in the different localities in this Division:—

McDonald creek	11
Halfmoon bay	5
Bear point	3
Seechelt and Porpoise bay	13
McNabb creek and valley	19
Along Pacific Great Eastern Railway	35
Mill creek	3
Narrows arm	8
Daisy lake	3
Brunswick mountain	6
Egmont	8
Salmon arm	7
Anvil island	1
Bowen island	3
Cypress and Lynn creeks	3
Mount Diadem, Brittain river	11
Total	139

Although there were fewer claims located, many more free miners' certificates were issued, and the revenue was nearly $3,000 larger than the previous year, this year's receipts being the largest of any year since this office was opened.

Wm. Savage, trustee for the Attorney Copper Gold Syndicate, whose claims are situated on Howe sound, states: "Practically no development-work was done in 1920 except the annual assessment. In doing this work on the south end of the property, about three-quarters of a mile south of former, ore discoveries were made which we expect to thoroughly investigate this year. The company intends to expend several thousand dollars in development this season and believes that will put the property in shape to turn over to some operating company. Our ore display at the Vancouver Exhibition in 1920 received two first prizes and three second prizes. On request of W. M. Brewer, Resident Engineer, we sent samples of our ore to Victoria to be forwarded to London, England, for exhibition there."

C. M. Oliver, secretary of the Bowena Copper Mines, Limited, situated on Bowen island, states: "Concentrating plant of 100 tons daily capacity was completed in April, and a trial run was made under the supervision of G. S. Eldridge, assayer and metallurgist. While it was found that the flotation process worked satisfactorily by the use of salt water, the power obtained from the boiler in use was not sufficient to keep the plant running at capacity, and it was recommended that a new boiler be installed before attempting to run steadily; also that additional wharfage would be necessary to provide accommodation for a supply of coal sufficient to meet the requirements of the plant. During the summer a wharf was constructed to accommodate 200 tons of coal, but owing to faulty construction was destroyed by the unusually severe storm of November 26th. The lessees of the property have secured an extension of their lease until 1930 and will install a new boiler and build a new wharf as soon as the necessary financial arrangements can be made."

Work on the Snug Cove Copper Company's claims situated on Bowen island was suspended early in the spring, but the company expects to resume operations early in 1921.

T. Grovum, part owner of the *Lilly Grovum* group of twelve claims, situated about 5 miles north-west of the mouth of Brittain river, Jervis inlet, states that their ore is galena, zinc, chalcopyrite, and pyrrhotite, carrying values in silver and copper from $60 to $140 and in one case $9 in gold. The ore is exposed on the surface in twelve different places. Work has been done on six of these showings by stripping off the capping. In every case solid ore was uncovered, varying in width from 3 to 10 feet, with still further enrichment of the enclosed rocks. With proper development there is every indication that another profitable mine has been added to the mineral wealth of British Columbia.

J. W. D. Moodie, who was general manager of the Britannia Mining and Smelting Company, Limited, for a long time, resigned during the year, and E. J. Donohue, who had been secretary-treasurer during Mr. Moodie's term of office, succeeded him as general manager. He has furnished me with the following information in regard to his company's work during the past year:—

"*Mining and Development Work.*—Underground shrinkage stope mining was carried on throughout the year and glory-hole mining during the open months. The operations were in the *Bluff*, *Fairview*, *Empress*, and *Victoria* sections of the mine. Considerable development-work was completed in the *Bluff* section on the 1,400- and 1,600-foot levels, opening up this body of ore for actual stoping. Also a working-face on the 1,800-foot level is advancing towards the *Bluff* deposit from the main No. 1 shaft. A main transfer raise was completed for the direct handling of *Bluff* glory-hole ore from the surface to the 1,600-foot level, where with one handling it is delivered to the underground crushers. In the *Fairview* section of the mine the sixth vein has been opened to the 1,600-foot level. Prior to 1920 this was known only to the 1,200-foot level. To the east of the *Fairview* the *Empress* section has been partially developed by crosscuts on the 1,600-foot level. A raise from this level is being driven for a connection with the 1,200-foot level and 1,000-foot level above. Going farther east into the *Victoria* section, the deposit is being prospected by the Amy and Crocker tunnels on the 1,900-foot level. Both of these adits have considerable hard-pan to encounter before reaching bed-rock. During the year some diamond-drilling was done in this section to prospect the deposit. In order to get down two of the holes a stand-pipe had to be driven to bed-rock before drilling could be started. In each case this stand-pipe was driven to a depth of 150 feet. Other diamond-drilling in the mine was done on the 1,600- and 1,200-foot levels, and outside the mine a 1,055-foot horizontal hole was drilled in the face of the Hillside tunnel, which is west of the *Jane* mine on the 1,000-foot level.

"This diamond-drilling was divided up as follows: 1,000-foot level, 1,563 feet; 1,200-foot level, 728 feet; 1,600-foot level, 1,025 feet; 1,800-foot level, 2,380 feet; total, 5,696 feet. The outside blacksmith and machine-shop which had been maintained on the 1,000-foot level

was abandoned, and a first-class shop constructed at the portal of the 2,200-foot level tunnel. This shop is commodious and first-class equipment is installed therein, which permits of the economical handling of our mine-work. During the year two 6-ton Exide Cell storage-battery locomotives have been added to our previous equipment of twelve 3½-ton ones. Included among the minor equipment additions was the purchase of an Armstrong Shuveloader to help out our shovelling operation. This unit is easy of operation and since being placed in service has worked most satisfactorily.

"Development-work consisted of 7,581 feet, made up as follows: Raises, 1,454 feet; drifts, 2,825 feet; crosscuts, 2,208 feet; chutes, 1,094 feet.

"As you know, the decline in price of copper necessitated our discontinuing operations the latter part of November, since when we have been employing in the neighbourhood of 250 men on a development programme. The railroad and tramway lines are being utilized for the transportation of a small tonnage daily to the stock-piles at the beach in order to maintain haulage facilities for the transportation of foodstuffs, etc., to employees residing at the Tunnel camp. We are also maintaining a force of twelve men on the work of driving a raise connection between the 4,100- and 2,700-foot level tunnels. This raise, when completed, will supplant the incline railway as an ore-carrier, and at December 31st had attained a distance of 600 feet."

While the revenue is the largest of any year since this office was opened, much more work and time were entailed than the list of statistics would represent.

Many prospectors locating claims or having business in other divisions make use of this office for forms and information, and when any mining strike is on this office is kept busy by the general public answering inquiries *re* same.

OFFICE STATISTICS—VANCOUVER MINING DIVISION.

Free miners' certificates issued	2,209
Free miners' certificates (special)	25
Free miners' certificates (company)	75
Claims recorded	139
Abandonments recorded	7
Certificates of work issued	320
Surveys recorded as work	7
Receipts issued for money in lieu of work	27
Grouping notices filed	31
Documents filed	2
Conveyances recorded	75
Certificates of improvements recorded	89

Revenue.

Free miners' certificates	$15,356 95
Mining receipts	4,604 80
Total	$19,961 75

NEW WESTMINSTER MINING DIVISION.

REPORT BY IRVING WINTEMUTE, MINING RECORDER.

I have the honour to submit the following report of mining operations in the New Westminster Mining Division for the year ending December 31st, 1920:—

The claims recorded during the year were distributed as follows:—

Chilliwack river	9
Pitt lake	20
Kanaka creek	1
Deer lake	1
Harrison lake	42
Lillooet lake	3
Stave lake	3
Wahleach lake	4
Total	83

The office statistics show a slight decrease in revenue from the previous year, although the number of new claims recorded and certificates of work issued show an increase over last year.

As will be seen by the above list, more prospecting has been done in the Harrison Lake vicinity than formerly. Several new locations were made on Fire mountain, at the head of the lake, in which section there was quite a stampede in the years 1897 and 1898.

Considerable work was done on the *Anna* group, situated near Agassiz, and a car-load of ore was reported to have been shipped during the year.

The annual assessment-work has been performed on practically all the old claims in the district.

Prospecting for oil has been carried on during the year by several companies, a few of the important of which are : Boundary Bay Oil Company at Boundary bay; the Spartan Oil Company near Burnaby lake; the Monarch Oil Company and the Empire Oil and Gas Company near Aldergrove; and the Pitt Meadows Oil Company on Pitt Meadows. Although drilling operations have been carried on, in some instances to a depth of 2,000 feet or better, and favourable indications encountered, no report of a commercial well has yet reached me.

Office Statistics—New Westminster Mining Division.

Free miners' certificates issued (individual)	180
Free miners' certificates issued (special)	1
Mineral claims recorded	83
Certificates of work issued	106
Conveyances, etc., recorded	36
Grouping notices filed	10
Receipts issued for money in lieu of work	1
Abandonments recorded	3
Certificates of improvement issued	1

Revenue.

Free miners' certificates	$ 775 25
Mining receipts, general	857 90
Total	$1,633 15

INSPECTION OF MINES.

REPORT BY JAMES MCGREGOR, CHIEF INSPECTOR.

I have the honour to submit my annual report as Chief Inspector of Mines for the Province for the year 1920.

I append the District Inspectors' reports on the condition of the mines in their respective districts in regard to safety and sanitation, the number of persons employed in and around the coal-mines, the tonnage of coal mined, list of accidents and prosecutions, and the reports of the Instructors in Mine-rescue Work and First Aid.

PERSONNEL OF STAFF OF INSPECTORS AND INSTRUCTORS.

Inspectors.

James McGregor	Chief Inspector.
Robert Strachan	Senior Inspector, Fernie (Kootenay and Boundary Districts).
John MacDonald	Inspector, Fernie.
H. H. Johnston	Temporary Inspector, Rossland.
Henry Devlin	Inspector, Nanaimo.
T. R. Jackson	Inspector, Nanaimo.
J. G. Biggs	Inspector, Merritt.
Thomas J. Shenton	Inspector, Prince Rupert.

Instructors, Mine-rescue Stations.

J. T. Puckey	Instructor, Fernie.
John D. Stewart	Instructor, Nanaimo.
John Thompson	Instructor, Cumberland.
W. C. Stone	Instructor, Middlesboro.

By amendment to the "Coal-mines Regulation Act" during 1919 the Board of Examiners for coal-mine officials and miners was placed under the jurisdiction of the Inspection Branch. The personnel of the Board of Examiners for coal-mine officials is as follows:—

James McGregor, Chairman.
James Dickson, Secretary, Member of Board, and Acting Inspector of Mines.
Harry E. Miard, Member of Board and Acting Inspector of Mines.

Messrs. Dickson and Miard and the District Inspector for the district in which an examination is being held form the Board for granting certificates of competency to coal-miners. An Inspector of Mines is empowered to grant provisional certificates to miners for a period not exceeding sixty days between regular examinations.

The Inspection Branch suffered the loss of one of the staff by the death of William Lancaster on May 29th at Fernie. Mr. Lancaster was a faithful and efficient official. He was instantly killed when the automobile which he was driving left the road and ran off a bridge.

There have been changes in the inspection staff and new appointments made during the year. On May 10th George Wilkinson, Chief Inspector for the Province, resigned, and Inspector James McGregor was appointed Chief Inspector, with headquarters at Victoria. On July 16th John McDonald was appointed Inspector at Fernie to fill the vacancy caused by the death of William Lancaster. John G. Biggs was appointed Inspector, with headquarters at Merritt, to fill the vacancy caused by the promotion of James McGregor to Chief Inspector, who previously had been Inspector for that district.

TONNAGE OF COAL PRODUCED.

The gross tonnage mined by the coal-mines of the Province for the year 1920 amounted to 2,696,774 tons, being an increase over the previous year of 287,826 tons. This increase was mainly due to the steadier operations in the Crowsnest field.

The output would have been larger if the Crowsnest field had operated continuously during the year. There were a few days lost in March in that field and two weeks lost in November owing to labour trouble.

The Coast District, which includes Nicola-Princeton, Vancouver Island, and Telkwa, produced 1,849,385 tons, an increase compared with the previous year of 757 tons.

The Vancouver Island collieries produced during the year 1,698,254 tons, showing a decrease compared with the previous year of 1,094 tons.

The Telkwa mines in the Northern District produced 1,400 tons for the year, being a decrease of 352 tons.

The Crowsnest Pass District produced during the year 847,389 tons, being an increase over the previous year of 288,583 tons.

Accidents in Coal-mines and Metalliferous Mines.

The compilation of tables showing number and character of accidents in coal-mines and metalliferous mines in British Columbia is undertaken by the Workmen's Compensation Board under the "Workmen's Compensation Act."

The fatal accidents only will be dealt with in my annual report in connection with tonnages and persons employed, as shown by the following tables:—

Fatal Accidents in and around Coal-mines.

The fatalities in and around coal-mines during the year totalled seventeen. There were 6,349 men employed in and around the coal-mines.

The ratio of accidents per 1,000 persons employed was 2.67, compared with 2.013 in 1919; in 1918 the ratio was 5.159 and in 1917 it was 8.51. The ratio for the last ten years was 4.053.

The following table shows the collieries at which fatal accidents occurred during 1920, and their relation to accidents which occurred in 1919:—

Name of Company.	Name of Colliery.	1920.	1919.
Canadian Collieries (D.), Ltd.	Comox Colliery	3	5
Canadian Collieries (D.), Ltd.	Extension Colliery	2	2
Canadian Western Fuel Co.	Nanaimo Colliery	4	4
Pacific Coast Coal Mines, Ltd.	South Wellington Colliery	2	..
East Wellington Coal Co.	East Wellington Colliery	..	..
Nanoose Collieries Co., Ltd	Nanoose Colliery	..	..
Middlesboro Collieries Co.	Middlesboro Colliery	1	..
Fleming Coal Co.	Coal Hill Colliery	..	..
Princeton Coal & Land Co.	Princeton Colliery	..	..
Coalmont Collieries, Ltd.	Coalmont Colliery	..	..
Crow's Nest Pass Coal Co.	Coal Creek Colliery	2	1
Crow's Nest Pass Coal Co.	Michel Colliery	1	..
Corbin Coal & Coke Co.	Corbin Colliery	..	..
Telkwa Collieries, Ltd.	Telkwa Colliery	..	..
Granby Collieries	Cassidy Colliery	2	..
Totals		17	12

The following table shows the various causes of fatal accidents in coal-mines and the percentage of the whole, with corresponding figures for the previous year:—

Cause.	1920.		1919.	
	No.	Per Cent.	No.	Per Cent.
Fall of rock	8	47.06	4	33.00
Fall of coal	2	11.76	4	33.00
Haulage	5	29.42	4	34.00
Explosions	..	.....	..	....
Breaking of ropes and chains	..	.....	..	.....
Falling timber	..	.....	..	.....
Material falling in shaft	1	5.88	..	.....
Fell from scaffold	1	5.88	..	.....
Totals	17	100.00	12	100.00

The number of tons of coal mined for each fatal accident during the year 1920 was 158,633, compared with 200,745 tons in 1919.

FATAL ACCIDENTS IN METALLIFEROUS MINES.

There were five fatal accidents in and around the metalliferous mines during the year 1920, being a decrease of one compared with the year 1919.

There were 3,341 persons employed in and around the metalliferous mines, a decrease of 437 compared with the previous year.

The ratio of fatal accidents per 1,000 persons employed was 1.54, compared with 1.588 in 1919. The ratio for the last ten-year period was 3.31.

The mines at which the fatalities occurred are:—

Mining Division.	Mine.	No. of Accidents.
Osoyoos	Nickel Plate	1
Trail Creek	Centre Star	1
Fort Steele	Sullivan	1
Skeena	Belmont-Surf Inlet	1
Ainsworth	Whitewater	1
Total		5

The following table gives the cause and percentage to the whole of the fatal accidents in metalliferous mines, with the corresponding figures for 1919:—

Cause.	1920.		1919.	
	No.	Per Cent.	No.	Per Cent.
Fall of ground	2	40.00	..	.....
By falling into chutes, raises, winzes, &c	1	20.00	4	66.66
By mine-car and haulage	..	.....	..	.....
Material falling in shaft	..	.....	..	.....
By cage in shaft	1	20.00	1	16.66
By explosions of powder	..	.....	..	.....
By explosions of gas	..	.....	..	.....
Miscellaneous (surface)	1	20.00	1	16.66
Total	5	100.00	6	100.00

There were two fatal accidents from falling ground in the metalliferous mines during the year 1920, being an increase from the previous year, when there were none; one from falling down chute; one from falling down shaft; and one miscellaneous.

There were no fatal accidents from explosions of powder, making three years in succession without a fatal accident from that cause.

The output from the metalliferous mines for the year 1920 was 2,178,187 tons, compared with 2,112,975 tons in 1919, being an increase of 65,212 tons.

The number of tons of ore mined for each fatal accident during 1920 was 435,637, compared with 352,162 tons in 1919, an increase of 83,475 tons.

EXPLOSIVES.

During the year 1919 one additional explosive was added to the permitted list for British Columbia, known on the United States permitted list as Coalite "A" L.F. This powder is manufactured by the Giant Powder Company. One change was made by the Canadian Explosives Company, having changed the number only of Dynobel No. 2 to Dynobel No. 4. The full list of explosives now on the permitted list is as follows:—

Monobel A1 ..... British List.
Monobel No. 1 ..... "
Dynobel No. 4 ..... "
Polar Permitite ..... "

Monobel	United States List.
Coalite "A" L.F.	" "
Monobel No. 4	" "
"Giant" Coal-mine Powder No. 5	" "
"Giant" Coal-mine Powder No. 6	" "
"Giant" Coal-mine Powder No. 7	" "
"Giant" Coal-mine Powder No. 8	" "
"Giant" Coal-mine Powder No. 9	" "
Polar Brushite	" "
Vigorite No. 1	" "
Vigorite No. 2	" "
Vigorite No. 3	" "
Vigorite No. 4	" "
Miner's Friend No. 1	" "
Miner's Friend No. 2	" "
Miner's Friend No. 3	" "
Miner's Friend No. 6	" "
Miner's Friend No. 7	" "
Viking No. 1	" "

The following table shows the quantity of explosives used in the coal-mines of the Province during the year 1920, together with the number of shots fired, how shots were fired, tons of coal produced by pound of explosive used, and the average pounds of explosive per shot fired:—

District.	Quantity of Explosive used in Pounds.	Tonnage for District.	No. of Shots fired by Electricity.	No. of Shots fired by Fuse.	Total No. of Shots fired.	Tons of Coal per Pound of Explosive.	Average Pounds of Explosive per Shot fired.
Vancouver Island.....	521,261	1,698,254	670,270	...	670,270	3.25	0.77
East Kootenay.....	22,729	847,389	25,074	276	25,350	37.28	0.89
Nicola-Princeton.....	40,004	149,731	57,061	815	57,876	3.74	0.69
Northern District..	.....	1,400	.....	...	.....	... ..	....
Totals.....	583,994	2,696,774	752,405	1,091	753,496	4.61	0.77

The production of coal per pound of explosive used is 0.10 more than that of the previous year.

The Crowsnest Pass District shows a decrease of 17.22 tons per pound of explosive used, the yield being 37.28 tons, compared with 54.5 tons for 1919.

The Nicola-Princeton District shows a decrease of 0.46 ton per pound of explosive used, the yield being 3.74 tons, compared with 4.2 tons in 1919.

The Vancouver Island mines show a decrease of 0.25 ton per pound of explosive used, the yield being 3.25 tons, compared with 3.5 tons for 1919.

The estimated yield at Telkwa is 4 tons per pound of explosive used.

MACHINE-MINED COAL.

During the year mining-machines produced 151,722 tons of coal, or 5.51 per cent. of the whole; this is an increase compared with the amount of machine-mined coal in 1919, when the percentage of machine-mined coal was 4.75 of the whole.

Of the total machine-mined coal, the Canadian Western Fuel Company produced 50,911 tons, or 33.55 per cent. of the whole; the Canadian Collieries (D.), Limited, produced 65,000 tons of machine-mined coal, or 42.82 per cent.; the Princeton Coal and Land Company produced 20,717 tons, or 13.65 per cent. of the total during the year, all of which was machine-mined; the Crow's Nest Pass Coal Company produced 11,819 tons, being 7.78 per cent.; Nanoose Collieries produced 3,000 tons, or 1.97 per cent.; and Chu Chua produced 275 tons, or 0.18 per cent. of the total machine-mined coal.

The following table gives the district, number of machines, how driven, tons of coal produced, and type of machine used:—

District.	Types of Machine in Use.		Tons of Coal produced by		Total Tons.
	Compressed Air.	Electricity.	Electricity	Compressed Air.	
Vancouver Island	16	5	65,000	53,911	118,911
Nicola-Princeton	7	..	.....	20,992	20,992
Crowsnest Pass	4	..	.....	11,819	11,819
Totals	27	5	65,000	86,722	151,722

Safety-lamps.

There were 4,719 safety-lamps in use in the coal-mines of the Province during the year 1920, a decrease of 296 as compared with the previous year. Of this number, 1,273 were flame-lamps of the Wolf type and 3,446 were electric cap-lamps, mostly Edison electric cap-lamps. There was a decrease of 147 in the number of electric lamps in use during the year.

The following table shows the distribution of lamps by districts, method of locking, and the illuminant used:—

District.	Magnetic.	Screw or Automatic Clip.	Naphtha.	Electricity.
Crowsnest Pass	120	1,096	120	1,096
Nicola-Princeton	76	190	76	190
Vancouver Island	1,077	2,160	1,077	2,160
Totals	1,273	3,446	1,273	3,446

The Edison cap safety-lamp after another year's trial or test is finding still greater favour with both operator and workmen, and has proven beyond any doubt to be a very efficient and safe lamp. As was stated in last year's Annual Report, it was beyond doubt the means of saving one life during the year 1919.

A bump occurred in No. 3 East mine, Coal Creek, caving the place and giving off a large quantity of explosive gas. A miner was imprisoned for a time. Inspector Robert Strachan is of the opinion it was owing to his having an Edison electric lamp he owes his life, as any other type of safety-lamp now in use would have been put out by the gas given off, leaving him in the dark and preventing him from finding his way over the caves.

Mine-air Sampling.

The same system of taking mine-air samples as was followed during the year 1919 was continued during the year 1920 throughout the Province. Careful checking has been made between the chemical analysis received from the laboratory at Ottawa and the results from the Burrell gas-detector in use in the different mines by the Inspectors. As found in 1919, the difference was less than one-tenth of 1 per cent., showing conclusively that the Burrell gas-detector is a very accurate and valuable instrument.

The Inspector of each coal-mining district is supplied with the Burrell detector, while the operating companies make use of them.

During the year 1919 the Hon. William Sloan, Minister of Mines, had a chart prepared in booklet form and issued to the officials and workmen, showing the length of flame-cap on a Wolf safety-lamp for the different percentages up to 2½ per cent. This chart was compiled from actual tests covering nearly two years.

The following table shows the data obtained from the mine-air samples in coal-mines during the year 1920:—

RETURNS FROM MINE-AIR SAMPLES TAKEN IN THE VARIOUS COAL-MINES OF THE CROWSNEST DISTRICT DURING THE YEAR 1920.

Sample No.	Date.	Mine.	Ventilating District.	Working or Idle.	Tonnage per Day.	Tonnage of Split per Day.	Chemical Analysis.				Velocity of Air in Feet per Minute.	Quantity of Air in Cubic Feet per Minute.	Barometer.	Hygrometer.			Cubic Feet of Methane per Minute.	Cubic Feet of Methane per Day.	Cubic Feet of Methane per Ton of Coal mined.
							CO_2.	O.	CH_4.	N.				Wet Bulb.	Dry Bulb.	Humidity.			
		Coal Creek.											"	°	°	%			
546	" 20	No. B. North	Main return	Working	200	....	0.15	20.53	0.95	78.37	560	39,200	25.904	7.00	47.0	100	372	535,680	2,267
547	" 22	No. 1 East	"	"	....	....	0.17	20.45	0.52	78.86	130	6,500	26.005	5.00	58.0	82	39	56,160	.....
551	" 22	"	"	"	400	....	0.22	20.30	1.16	78.32	900	108,000	26.00	52.0	53.0	93	1,252	1,802,880	4,507
552	" 26	No. 1 North	"	"	300	....	0.35	20.23	0.33	79.09	400	16,000	25.60	60.0	61.0	93	53	76,320	254
556	Feb. 6	No. 2 C.C.	"	"	300	....	0.15	20.56	0.55	78.74	320	32,000	25.90	50.0	51.0	93	176	707,000	1,767
557	" 9	No. 1 South	"	"	400	....	0.23	20.23	1.26	78.28	600	39,000	25.70	58.0	60.0	88	491	707,000	1,767
566	" 20	No. B. North	"	"	200	....	0.17	20.43	1.26	78.14	590	35,400	26.00	45.5	45.0	100	446	642,240	3,211
576	April 8	No. 1 East	"	"	400	....	0.15	20.37	1.11	78.37	1,100	121,000	25.60	51.0	53.0	86	1,343	1,933,900	4,834
584	" 14	No. 2 C.C.	"	"	250	....	0.25	20 28	0.88	78.59	970	38,800	25.50	56.0	57.0	98	341	491,000	1,964
619	June 15	"	"	"	200	....	0.30	20.20	0.95	78.55	450	31,500	25.15	64.0	64.0	100	300	432,000	2,160
617	" 15	No. 1 South	"	"	325	....	0.31	20.04	1.31	78.34	700	45,500	25.15	58.0	59.5	91	596	858,240	2,640
608	" 9	No. 1 East	"	"	400	....	0.14	20.36	1.14	78.36	1,000	120,000	25.50	53.0	55.0	87	1,368	1,969,900	4,924
292	" 10	No. 3 East	"	"	300	....	0.16	20.26	1.51	78.07	1,350	85,050	25.60	50.5	50.0	100	1,283	1,847,500	6,000
611	" 9	No. 1 East	South split	"	400	320	0.14	20.21	1.64	78.01	720	57,600	25.50	53.5	55.0	85	944	1,359,300	4,248
612	" 9	No. 9 C.C.	Main return	"	14	....	0.16	29.59	0.20	79.05	450	13,500	25.50	59.0	61.0	91	27	38,880	2,777
614	" 11	No. 3 East	South split	"	328	164	0.27	20.37	1.45	77.91	500	22,500	25.70	59.0	61.0	91	326	469,440	1,431
615	" 11	"	Main return	"	328	....	0.23	20.31	1.44	78.02	900	54,000	25.70	60.0	62.0	88	778	1,120,320	341
618	" 15	No. 2 C.C.	"	"	200	....	0.09	20.60	0.76	78.55	1,750	3,500	25.15	48.0	60.0	88	27	38,880	777
642	Aug. 12	No. 3 C.C.	Incline split	"	300	150	0.25	20.37	1.22	78.16	200	14,000	26.15	63.0	65.0	88	170	1,708,000	813
643	" 12	"	Slope split	"	300	150	0.30	20.34	1.45	77.91	600	24,000	26.15	60.0	63.0	88	348	501,120	328
644	" 12	"	Main return	"	300	....	0.27	20.32	1.37	78.04	850	55,210	26.15	62.0	64.0	88	756	1,088,640	3,628
...	Sept. 10	No. 1 South	"	"	350	....	0.33	20.00	1.37	78.30	600	39,000	25.65	64.0	65.0	94	534	767,960	2,194
307	" 8	No. 3 East	"	"	280	....	0.26	20.29	1.27	78.18	829	42,640	25.65	52.0	53.0	93	541	779,040	5,193
308	" 8	"	No. 6 East split	"	280	130	0.15	20.26	2.11	77.48	430	34,830	25.65	53.0	54.0	93	135	194,400	694
310	Oct. 12	"	West split	Idle	....	....	0.11	20.35	1.99	77.55	1,230	63,960	25.90	50.5	51.0	93	772	1,109,680	.....
311	" 12	"	Main return	"	....	....	0.17	20.31	1.83	77.69	1,660	104,583	25.90	52.5	52.0	100	1,913	2,754,720	.....
694	" 25	No. 1 East	No. 1 Slope split	Working	375	105	0.16	20.34	1.19	78.31	450	33,750	26.00	59.0	61.0	98	401	577,400	5,490
697	" 25	"	Main return	"	375	...	0.22	20.34	0.91	78.53	1,450	120,000	26.00	55.0	56.5	98	1,092	1,571,480	4,180
693	" 25	"	Tunnel split	"	375	120	0.12	20.59	0.57	78.72	350	16,800	26.00	51.5	53.0	86	96	136,800	1,140
703	" 27	No. 3 C.C.	Main return	"	325	....	0.23	20.38	1.12	78.27	800	52,000	26.00	62.0	63.0	94	528	838,080	2,581
701	" 27	"	Incline split	"	325	160	0.17	20.47	0.95	78.41	220	15,400	26.00	63.5	65.0	90	146	210,240	1,323
706	" 28	No. 1 South	Main return	"	325	....	0.31	20.07	1.29	78.33	600	36,000	25.56	64.5	65.0	93	463	666,720	2,050
710	Nov. 9	No. B North	"	"	200	....	0.13	20.54	0.85	78.48	900	58,500	26.50	48.5	49.0	97	579	720,000	360
709	" 9	"	Right side of slope	"	200	50	0.16	20.67	0.45	78.72	180	11,700	26.50	49.0	50.0	97	53	76,320	152
708	" 9	"	Left side of slope	"	200	150	0.20	20.39	1.53	77.88	110	8,800	26.50	49.0	50.5	93	135	153,900	126
744	Dec. 21	No. 1 South	Main return	"	350	....	0.11	20.25	0.80	78.84	840	45,360	25.80	62.0	63.0	93	362	521,280	1,488
743	" 21	"	"	"	350	....	0.14	20.36	0.72	78.78	560	36,960	25.80	61.0	62.0	93	266	383,040	1,094
742	" 21	"	"	"	350	....	0.08	20.61	0.50	78.81	120	16,800	25.80	54 0	55.0	93	84	16,800	346
330	" 22	No. 3 East	"	"	280	....	0.10	20.42	1.32	78.16	1,400	88,200	26.10	51.0	51.0	100	964	221,760	781
		Michel.																	
277	Jan. 8	Michel No. 3	Main return	Working	300	....	0.25	20.32	0.85	78.58	540	54,000	26.20	48.0	50.0	93	459	660,960	2,203
295	June 14	Michel No. 3	"	"	300	....	0.32	20.16	0.91	78.61	500	50,000	26.00	60.0	60.0	100	455	655,200	2,184
312	Oct. 12	Michel No. 3	No. 2 Slope split	Idle	....	....	0.16	20.38	1.00	78.46	50	4,500	25.90	55.0	55.0	100	45	64,800	.....

BUMPS IN COAL-MINES.

November 25th. In No. 1 mine, Coal Creek, in room 26, South split, a bump occurred giving off a large quantity of gas, differing from other bumps which have occurred. A very small quantity of coal was blown out. The gas-pressure had the effect of bulging out the coal-face in the room about 3 inches; no other damage resulted.

December 3rd. A slight bump occurred in No. 1 East mine, Coal Creek, in room 25, South split, causing a heavy flow of gas in the return airway; slight damage was caused at the face of room 25 by stringers being displaced, causing a small cave.

December 10th. A slight bump occurred in No. 1 East mine between 4.30 and 7.30 a.m. No one was working in that district at the time. No damage was done.

OUTBURSTS OF GAS.

Outbursts of gas have not been so frequent as last year, a few having occurred at the same time as the bumps in the Crowsnest mines already mentioned.

Drilling ahead of the advancing development-work has been carried on during the year with good results. This work has a tendency to reduce the gas-pressure in the face of the drifts or headings by allowing the gas to drain off through the drill-holes.

MINE FIRES.

There have been no serious new outbreaks of fire during the year. Those which had been walled off previously required careful supervision, and constant vigilance has been necessary to keep them under control.

EXPLOSIONS.

No explosions occurred during the year 1920. One slight ignition of gas occurred in East Wellington mine, in which one man was painfully burned, necessitating hospital treatment.

MINE-AIR SAMPLING.

There were a great many samples taken of the air in the coal-mines of the Province during the year 1920 and analysed at the Bureau of Mines at Ottawa. The results of these analyses are published with this report.

The Burrell gas-detector, which has proved a very valuable and accurate instrument in detecting very small percentages of methane in the mine-air, is constantly used by the Inspectors. One-tenth of 1 per cent. methane can be noticed in the air, a much lower percentage than could be detected by the use of any safety-lamp. The officials of the companies keep the Burrell gas-detectors constantly in use for testing purposes, and all the Coal-mine Inspectors are supplied with them by the Mines Department.

CARBON-MONOXIDE DETECTORS.

During the year 1920 the carbon-monoxide detector was perfected and approved by the United States Bureau of Mines. This will prove a very valuable instrument, especially in case of mine fires, in testing for the dangerous carbon-monoxide gas given off under such conditions. Formerly live canaries were used for this purpose, but were not very satisfactory. As soon as the instrument was approved by the Bureau of Mines of the United States the Hon. Wm. Sloan, Minister of Mines, ordered one for each rescue-station in the Province, where they are now installed.

I feel grateful to the Mines Department of Ottawa for the valuable information received from their Department, especially when this accurate work is done by them without charge.

MINE-RESCUE WORK.

Instruction in mine-rescue work has been actively and effectively maintained at the different rescue-stations throughout the Province during the year.

There were quite a number of men who took the course and qualified for certificates of competency; also a number who had qualified in previous years kept up their training during the year. At the present time there are 484 men who have qualified and secured certificates issued by the Mines Department.

The training course necessary to qualify for a certificate of competency consists of wearing the oxygen breathing apparatus for two hours a day for twelve days in an irrespirable atmosphere, performing considerable work while there, in addition to spending many hours familiarizing themselves with the many parts of the apparatus, testing of the apparatus for defects, and assembling it in the shortest time.

These volunteers deserve great credit for taking this course of training, as they do so without remuneration.

List of Persons who have received Mine-rescue Certificates during 1920.

Name.	Certificate No.	Where trained.	Date.
Owens, Thomas	459	Fernie	Aug. 25
Horrocks, Thomas	460	"	" 25
Ferryman, Hy.	461	"	" 25
Scales, Joseph	462	"	" 25
Almond, Alen	463	"	" 25
Davis, Alfred	464	"	" 25
McFagen, Robert	465	"	" 25
Devoy, William	466	Cumberland	" 25
McKinnon, Hugh J.	467	"	" 25
Rutherford, Joseph	468	"	Sept. 8
Shield, Thomas	469	"	" 8
Bates, Hamilton	470	"	" 8
Somerville, Alexander	471	"	" 8
Thompson, Thomas	472	Nanaimo	" 24
Hogan, George Eastman	473	"	" 24
Lavin, Joseph	474	"	" 24
Clarkson, Hugh	475	"	" 24
Young, Samuel	476	Cumberland	Oct.
Brown, Alfred A.	477	"	"
Derbyshire, Alexander	478	"	"
Williams, Cadwalader	479	"	"
Whitehouse, William	480	"	Nov.
Lockhart, James G.	481	"	"
Nash, Charles	482	"	"
Taylor, Alexander John	483	"	"
Boffy, John Henry	484	"	"

The following table shows the number, distribution, and type of mine-rescue apparatus and oxygen resuscitating devices maintained at the coal-mines of the Province during the year 1920:—

Company.	Draeger Apparatus.		Proto or Fleuss Apparatus.		Gibbs.	Paul.	Total Apparatus.	Resuscitating Devices.			Total.
								Pulmotor.		Lung-motor.	
	2-hour.	½-hour.	2-hour.	½-hour.				Type A.	Type B.		
Canadian Western Fuel Co.	4	..	4	2	6	..	16	2	-	2	4
Canadian Collieries—											
Extension	4	..	..	..	..	..	4	..	1	..	1
South Wellington	..	..	..	..	..	2	2	..	1	..	1
Comox	4	..	..	..	..	..	4	..	1	..	1
Vancouver-Nanaimo Coal Co.	2	1	..	..	..	..	3	1	..	..	1
Pacific Coast Coal Mines, Ltd.	2	2	..	..	2	..	6	1	..	..	1
Granby C. M. S. & P. Co.	4	..	..	..	..	..	4	..	..	1	1
Middlesboro Collieries.	2	1	..	..	..	..	3	1	..	..	1
Fleming Coal Co.	2	2	..	..	..	..	4	1	..	..	1
Merritt Colliery.	..	2	..	..	2	..	4	..	..	..	..
Princeton Colliery	1	1	..	..	..	..	2	1	..	..	1
Crow's Nest Pass Coal Co—											
Coal Creek.	5	6	..	..	..	..	11	2	..	..	2
Michel	5	5	..	..	..	..	10	1	..	..	1
Corbin Coal & Coke Co.	2	1	..	..	..	..	3	1	..	..	1
B.C. Government	16	10	..	..	12	6	44	4	4	..	8
Totals.	53	31	4	2	22	8	120	15	7	3	25

First Aid.

In this very important and valuable work great enthusiasm has been manifested throughout the Province, especially in the coal-mining centres, where exhibitions have been given at the different coal-mining companies' annual picnics, Labour Day celebrations, and on other occasions. Many flattering comments have been made by the doctors who have acted as judges at these demonstrations given in public.

This work requires constant practice to maintain proficiency. It is evident that hard and patient practice has been indulged in by Barton's team of the Canadian Western Fuel Company, of Nanaimo, which won first prize in the St. John Ambulance Association competition for miners, and also the Montizambert trophy, emblematic of the championship of Canada. The surface team of the No. 4 mine of Canadian Collieries at Cumberland won second place in the miners' contest.

It is gratifying to know we have such capable and conscientious workers in this important branch of relieving the injured in or about our mines and manufacturing plants.

EXAMINATIONS FOR COAL-MINE OFFICIALS.

The "Coal-mines Regulation Act," as now consolidated and amended, provides that all officers of a coal-mining company having any direct charge of work underground shall hold Government Certificates of Competency, which are to be obtained only after passing an examination before a duly qualified Board, appointed for the purpose of holding such examinations, and known as the Board of Examiners.

The certificates granted on the recommendation of such Board and the requirements shall be as follows:—

"(*a.*) If a candidate for a manager, that he is a British subject and has had at least five years' experience in and about the practical working of a coal-mine, and is at least twenty-five years of age; or, if he has taken a degree in scientific and mining training, including a course in coal-mining at a university or mining school approved by the Minister of Mines, that he has had at least four years' experience in and about the practical working of a coal-mine:

"(*b.*) If a candidate for overman, that he has had at least five years' experience in and about the practical working of a coal-mine, and is at least twenty-three years of age:

"(*c.*) If a candidate for shiftboss, fireboss, or shotlighter, that he has had at least three years' experience in and about the practical working of a coal-mine, is the holder of a certificate of competency as a coal-miner, and is at least twenty years of age:

"(*d.*) A candidate for a certificate of competency as manager, overman, shiftboss, fireboss, or shotlighter shall produce a certificate from a duly qualified medical practitioner or St. John or other recognized ambulance society, showing that he has taken a course in ambulance-work fitting him, the said candidate, to give first aid to men injured in coal-mine operations.

"For the purposes of this section the experience demanded by such section shall be of such character as the Board shall consider of practical value in qualifying the candidate for the position to which such class of certificate applies.

"Experience had in a mine outside of the Province may be accepted should the Board consider such of equal value."

Any certificate is considered as including that of any lower class.

EXAMINATION FOR MINERS.

In addition to the examinations and certificates already specified as coming under the Board of Examiners, the Act further provides that every coal-miner shall be the holder of a certificate of competency as such. By "miner" is meant "a person employed underground in any coal-mine to cut, shear, break, or loosen coal from the solid, whether by hand or machinery."

Examinations of applicants for certificates of competency as coal-miners shall be conducted and certificates of competency granted by a Board of Examiners, which shall consist of the Inspector of Mines for the district in which the examination is held, and two other members to be appointed by the Minister, one of whom shall be appointed to represent the mine-owners and one to represent the coal-miners. The two appointed members of the Board shall have jurisdiction in all districts throughout the Province. The Minister shall appoint one of the appointed members to be Chairman and the other to be Secretary of the Board, and they shall hold office during the pleasure of the Minister.

Where any member of the Board of Examiners is unable to act at any examination by reason of illness, absence, or other cause, the Minister may appoint a person to act in the stead of that member for that occasion, or until the termination of the disability, and any person so appointed may complete any unfinished business of the Board in which he has taken part, even if the member in whose stead he has acted has become able to act.

The proceedings of the Board of Examiners shall be in accordance with the rules in the Third Schedule to the Act.

Examinations of applicants for certificates of competency as coal-miners shall be held on at least one day in every period of sixty days at each colliery designated by the Minister as a place for the holding of examinations under this section.

The work of the Board of Examiners in examining candidates for coal-miners' certificates has been carried on in all mining districts at intervals of less than sixty days, as required by the amendment of the Act.

No certificates have been granted in any case where the candidate failed to satisfy the Board as to his general fitness, experience in a coal-mine, and a working knowledge of the English language.

During 1920 eighty-three examinations were held for candidates for certificates of competency as coal-miners in the various coal-mining districts of the Province and 545 certificates issued. In addition to above, a number of duplicate certificates were issued to coal-miners who had lost their original certificates of competency.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS.

First-, Second-, and Third-class Certificates.

Report of James Dickson, Secretary of Board.

I have the honour to submit herewith the annual report of the transactions of the above Board for the year ending December 31st, 1920.

The Board of Examiners, which was formed on July 1st, 1919, at present consists of James McGregor, Chief Inspector of Mines, as Chairman; Harry Ernest Miard, member; and James Dickson, member and Secretary of the Board.

The meetings of the Board are held in the office of the Board, Mines Department, Victoria. The first work was the drafting of the following rules for the conduct of examinations for certificates of competency as mine officials:—

Rules made by the Provincial Board of Examiners, July 16th, 1919, and approved by the Minister of Mines, July 16th, 1919, under Section 38 of the "Coal-mines Regulation Act, 1911," and Amendment Act, 1919, for the Conduct of Examinations.

1. No application for examination will be considered from any candidate unless it is received by the Department of Mines at least fifteen days previous to the date on which the examination is to be held.

2. The examination sittings shall begin at 9 a.m. and continue until 12.30 p.m.; they shall resume at 2 p.m., and continue until 5.30 each day until the conclusion of the examination.

3. The examinations shall be conducted by the Presiding Examiners appointed by the Board.

4. The Presiding Examiners shall be present in the examination-room at least fifteen minutes prior to the time at which the examination commences.

5. Before each examination the question papers shall be prepared by the Examiners appointed by the Minister, and the necessary copies forwarded to the Presiding Examiners, each set of papers being in a separate sealed package.

6. At the time of the commencement of each session of the examination, when the candidates are in their respective places, the seal of the package shall be broken in the examination-room in the presence of the candidates and the papers distributed punctually in accordance with the time-table on the package.

7. Candidates must present themselves punctually at the hours appointed for the commencement of the examination, and no candidate will be allowed to enter the examination-room later than forty-five minutes after the time set for the commencement of the examination, nor will any candidate be allowed to leave the room during a sitting unless in case of extreme necessity.

8. When the time allotted to each paper has expired, the papers shall be collected by the Presiding Examiners and immediately placed in a package and sealed. At the completion of the examination these papers shall be forwarded to the office of the Board of Examiners for Coal-mine Officials, Victoria, B.C.

9. The examination shall be conducted strictly in accordance with these rules, and the papers of any candidate who does not comply with these rules may be cancelled at the discretion of the Board.

10. The Presiding Examiners shall see that the room is clear of all possible aid to the candidates, and that no persons other than the Honourable the Minister of Mines, the Deputy Minister of Mines, the Provincial Mineralogist, members of the Board, Inspectors of Mines, and Examiners be allowed in the examination-room during sessions.

11. All stationery required for the purpose of the examination shall be supplied by the Board. All surplus stationery shall be collected by the Presiding Examiners at the completion of the examination. Each candidate shall be supplied with pens, ink, pencils, and blotting-paper.

12. The papers shall be collected at the times indicated by the time-table. If from any cause a paper is not given out precisely at schedule time, the candidates must be informed of the fact and the exact time at which their work will be collected, and care must be taken that the exact time is allowed from the moment from which the paper was given out. The time consumed in collecting and giving out papers must not be included in the "full time" allowed for any paper. A candidate who attends late shall not be allowed any extension of time on that account.

13. Before proceeding to his seat in the examination-room a candidate shall lay aside his hat and overcoat, and any book, papers, or appliances the use of which is not expressly allowed to him. The candidate shall be allowed to bring with him a drawing-scale, slide-rule, protractor, a pair of compasses, and logarithmic and trigonometrical tables. Apart from such special articles, a candidate shall be at liberty to take to his place in the examination-room such ordinary appliances as pens, ink, penknife, chalks, and india-rubber; but the Presiding Examiners may, at their discretion, prohibit the use of any such articles.

14. If a candidate arrives late a note of the circumstances shall be made, and it shall always be stated whether any other candidate has already left the room.

15. The Presiding Examiners shall collect at the commencement of the examination the authorization obtained from the Department of Mines for appearing at the examination-room, and no candidate shall be allowed to enter the examination-room unless he presents such authorization.

16. Silence shall be observed in the examination-room while the examination is in progress.

17. The Presiding Examiners shall take every precaution to see that no candidate receives any improper assistance, either from books or papers or from any person. They shall check all disorderly or improper conduct in or about the room, enforce all rules for the conduct of the examination, and report to the Board any irregularity which may occur or any shortcoming in the arrangements for the examination.

18. Should it appear to the Presiding Examiners that a candidate has obtained improper assistance the papers of such candidate shall be cancelled. Any candidate giving assistance to another candidate shall be held to be equally guilty and shall be dealt with accordingly.

19. No candidate shall be allowed to leave the examination-room until the expiration of one hour after the time fixed for the commencement of the paper on which he is engaged.

A candidate obliged to leave the room through illness or other sufficient cause, and who wishes to return and continue work on the paper then in progress, shall leave the room in charge of a Presiding Examiner; a note as to the circumstances shall be made and the part of the paper at which the candidate was at work shall be endorsed by the Presiding Examiner, "The candidate left at this point."

Candidates shall not, without the express permission of the Presiding Examiners, remove from the examination-room any paper or other material supplied to them.

20. A candidate who asks a question as to any ambiguity in the papers shall be told to enter on his work any representation he may wish to make, but no further answer shall be given. The

Presiding Examiners shall, themselves, forward a report to the Board stating the candidate's name and the general nature of the question.

A candidate making a complaint of any other nature shall be directed to make his statement in writing, which shall be sent to the Board.

21. Candidates shall be allowed, unless there is any special directions to the contrary, to keep their work in any subject until the expiration of the time allotted to that subject.

Every book, plan, form, or separate sheet of paper used by the candidate shall have inserted on it the name of the subject. The number of each question shall be inserted in the margin which shall be left along the left side of each sheet. In no case shall the name of the candidate be placed on any book, plan, form, or separate sheet of paper upon which the candidate has written or worked the answer to any question; but for the purpose of identification of papers the following system shall be used: At the commencement of the examination each candidate shall choose a number; he shall place this number on a slip furnished for this purpose, together with his name, and place the same in an envelope supplied for the purpose. These envelopes shall remain sealed until the paper has been examined. The candidate shall number all his examination papers with the number he has chosen and placed on the slip with his name.

22. Not more than one answer shall be written on the same sheet of paper. All answers shall be written in ink (except necessary diagrams, which may be in pencil) and on one side only of the paper, and each candidate shall enclose his question paper with his answers in the envelope supplied for the purpose.

23. After the Examiners have received the papers they will correct them and mark on them the marks obtained by each candidate for each paper.

24. After the examination the candidate will be furnished with a list of the marks obtained by him in the different subjects, but not the marks for the individual questions.

25. The apparent or presumed results of the examination shall not be communicated to any person until the same have been officially announced.

26. All correspondence intended for the Board must be addressed to the "Office of the Board of Examiners for Coal-mine Officials, Victoria, B.C."

27. The Presiding Examiners must see that the candidate obtains the right paper of questions.

28. All the work by which the results are obtained shall be clearly shown in immediate connection with the answer, so as to enable the Examiners to satisfy themselves that the candidate has understood the question and to see by what process the results were obtained. Anything which the candidate does not wish the Examiners to notice should be crossed out with pen or pencil, but not erased.

29. In the case of any applicant producing a certificate from a medical practitioner instead of from a recognized ambulance society, as provided for in section 41, subsection (*c*), such certificate shall be in the following form:—

"I hereby certify that I have examined , of , in ambulance-work, and find him qualified to render first aid to persons injured in or about a mine.

"(Signed.).....
Medical Practitioner."

30. The nature of the practical experience shall be experience gained in one or other of the following capacities in a coal-mine, or in a capacity which may be considered by the Board to be equivalent to:—

(*a.*) An underground official of a coal-mine—
(1.) In actual practical work at the working-face and other parts of the underground workings of a coal-mine:
(2.) In direct supervision of such work; or
(3.) In both (1) and (2); or

(*b.*) As an underground workman of a coal-mine who has had direct practical experience in the work of getting minerals, and of stonework, timbering, and repairing:

(*c.*) As mine surveyor. In the case of a person employed as mine surveyor, the practical experience will be considered to be the time the applicant has been employed underground in a coal-mine.

31. Candidates for certificates must possess such knowledge as will enable them to answer promptly questions on the following subjects:—

For First-class Certificates—
(1.) Mining Act and Rules:
(2.) Mine Gases:
(3.) Ventilation:
(4.) General Work:
(5.) Mining Machinery:
(6.) Surveying and Levelling.

For Second-class Certificates—
(1.) Mining Act and Rules:

(2.) Mine Gases.
(3.) Mine Ventilation:
(4.) General Work, including questions on underground machinery and surveying.

For Third-class Certificates—
(1.) Mining Act and Rules and Mine Gases:
(2.) Mine Ventilation and General Work.

For Mine Surveyors' Certificates—
Surveying, levelling, and drawing; determination of magnetic declination; loose and fast needle surveying underground and on the surface; calculation of areas and volume; contour lines and levelling; connecting of surface and underground surveys; triangulation; plotting by protractor and latitudes and departures; mine plans and sections; the use, care, and testing of the instruments.

32. A candidate for First-class Certificate of Competency must obtain 70 per cent. of the maximum marks obtainable for the first three subjects, Mining Act and Rules, Mine Gases and Ventilation; and 60 per cent. of the marks obtainable on the fourth, fifth, and sixth subjects—namely, General Work, Mining Machinery, Surveying and Levelling; and 70 per cent. of the marks obtainable for the whole examination.

33. A candidate for a Second-class Certificate of Competency must obtain 70 per cent. of the marks obtainable for the first three papers, Mining Act and Rules, Mine Gases, and Mine Ventilation; and 60 per cent. for the fourth subject, General Work; and 70 per cent. of the marks obtainable for the whole examination.

34. A candidate for a Third-class Certificate of Competency must obtain not less than 65 per cent. of the marks obtainable on the first subject, Mining Act and Rules and Mine Gases; not less than 60 per cent. of the marks obtainable on the second paper, Ventilation and General Work; and not less than 65 per cent. of the marks obtainable for the whole examination.

35. A candidate for a Mine Surveyor's Certificate of Competency must obtain 70 per cent. of the marks obtainable for the whole examination.

In view of the following regulation made, pursuant to the provisions of the "Coal-mines Regulation Act," by the Lieutenant-Governor in Council, examinations for mine surveyors' certificates of competency were also held:—

REGULATION.

1. After the 1st day of October, 1919, all plans required to be kept in accordance with the provisions of the "Coal-mines Regulation Act" shall be made of durable material, and the surveying of mines and the preparation of mine plans shall be done by a person or persons holding a certificate granted under the provisions of the "Coal-mines Regulation Act" and Amendment Acts.

2. In no case shall a certificate be granted to any applicant until he has satisfied the Board of Examiners that:—
(1.) He has had two years' practical experience in the surveying of mines, or is the holder of a diploma in scientific and mining training after a course of study of at least two years at an educational institute approved by the Minister of Mines, or has taken a degree in scientific mining subjects at a university so approved:
(2.) He is competent:—
(*a.*) To make an accurate survey of the workings of a coal-mine and to connect such survey with a surface survey:
(*b.*) To make accurate survey and levellings:
(*c.*) To plot accurately surveys and levellings:
(3.) He has given satisfactory evidence of his sobriety and general good conduct.

3. Each plan required to be kept in accordance with the provisions of the "Coal-mines Regulation Act" shall have inserted on it the date on which the last survey was made and the signature of the person making such survey.

4. A certificate authorizing any person to act as mine surveyor may be granted to such person without written examination if the Board of Examiners reports that he has the necessary experience, and provided application is made for such certificate before the 1st day of December, 1919.

5. Every person who violates any rule or regulation under the "Coal-mines Regulation Act" or Amendment Acts shall be guilty of an offence against the "Coal-mines Regulation Act," and liable to the penalties and obligations imposed by the said Act.

Two examinations for candidates for certificates of competency were held during 1920; the first being held on May 25th, 26th, and 27th, and the second on November 23rd, 24th, and 25th.

The total number of candidates at these examinations was as follows: For First-class certificates, 9 (1 passed, 8 failed); for Second-class Certificates, 15 (8 passed, 7 failed); for Third-class Certificates, 27 (19 passed, 8 failed); for Mine Surveyor Certificates, 11 (6 passed, 5 failed).

The work of the candidates, especially for the higher certificates, leaves much to be desired.

It is the intention of the Board to maintain a high standard, so intending candidates, to gain a certificate of competency of any class, must give themselves thorough preparation.

The following is a list of the candidates who successfully passed the examination in the various classes:—

First-class Candidates.—Arthur Newbury.

Second-class Candidates.—Michael Dalton McLean, William Park, William Beveridge, Louis Francesini, Benjamin Ball, John Gilham, Hugh Osborne, and William Hynds.

Third-class Candidates.—Joseph Lavin, Joseph Travis, Robert Drybrough, Robert McFagan, Edward Hardy, William Ross, Robert Taylor, Henry Ferryman, Robert Clarkson, Steve Klejko, Frederick Menzies, Thomas Smith, George A. Brown, John Hynd, Ernest Waites, Ralph H. Chambers, John Walls, James Sim, and Preston Bruce.

Mine Surveyor Candidates.—Robert Strachan, George W. Waddington, James T. Hepburn, Edward Hughes, Everard S. Bowerman, and Austin Wright.

REGISTERED LIST OF HOLDERS OF CERTIFICATES OF COMPETENCY AS COAL-MINE OFFICIALS.

FIRST-CLASS CERTIFICATES—SERVICE CERTIFICATES ISSUED UNDER SECTION 39, "COAL-MINES REGULATION ACT, 1877."

Thomas A. Buckley.

FIRST-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL-MINES REGULATION ACT, 1897."

NAME.	DATE.
Shepherd, Francis H	March 5th, 1881
Honobin, William	May 1st, 1882
Little, Francis D	May 1st, 1882
Chandler, William	December 21st, 1883
Priest, Elijah	December 21st, 1883
McGregor, James	January 18th, 1888
Randle, Joseph	January 18th, 1888
Matthews, John	January 8th, 1889
Norton, Richard Henry	August 26th, 1889
Sharp, Alexander	October 27th, 1891
Kesley, John	March 4th, 1892
Wall, William H	May 30th, 1896
Morgan, Thomas	May 30th, 1896
Wilson, David	May 30th, 1896
Smith, Frank B	May 30th, 1896
Bradshaw, George B	June 12th, 1899
Simpson, William G	June 12th, 1899
Hargreaves, James	February 5th, 1901
Drinnan, Robert G	February 5th, 1901
Stockett, Thomas, Jr	August 3rd, 1901
Cunliffe, John	August 3rd, 1901
Evans, Daniel	August 3rd, 1901
Browitt, Benjamin	Aug. 3rd, 1901
McEvoy, James	October 17th, 1902
Wilson, A. R	October 17th, 1902
Simister, Charles	October 17th, 1902
Budge, Thomas	October 17th, 1902
Mills, Thomas	October 17th, 1902
Faulds, Alexander	October 17th, 1902
Richards, James A	October 17th, 1902
McLean, Donald	January 21st, 1904
Wilkinson, Geo	January 21st, 1904
Wright, H. B	January 21st, 1904
Coulthard, R. W	January 21st, 1904
Roaf, J. Richardson	January 21st, 1904
John, John	January 21st, 1904
Manley, H. L	January 21st, 1904
Baxter, Andrew	June 10th, 1911
Battey, Richard	May 27th, 1913
Newbury, Arthur	June 21st, 1921

FIRST-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	DATE.	NAME.	DATE.
Biggs, J. G.	July 22, 1908	McGuckie, Thomas	July 22, 1908
Bonar, Robert	Oct. 28, 1911	McKendrick, Andrew	May 27, 1913
Brace, Tom	May 13, 1915	McMillan, J. H.	Sept. 10, 1910
Bridge, Edward	July 22, 1908	McVicar, Samuel	May 1, 1909
Brown, David	May 21, 1914	Mazey, William John	Oct. 31, 1912
Brown, Robert Joyce	May 13, 1915	Miard, Henry Ernest	May 9, 1912
Caufield, Bernard	May 1, 1909	Michell, Dudley	Nov. 15, 1917
Church, James A. H.	June 10, 1911	Millar, John K.	Nov. 22, 1906
Cox, Richard	May 13, 1915	Miller, Andrew Anderson	Oct. 31, 1912
Crowder, James	June 10, 1911	Montgomery, John W.	May 1, 1909
Cunningham, John Howard	May 9, 1912	Moore, Wm. H.	May 17, 1917
Davidson, W. A.	May 1, 1909	Mordy, Thomas	Sept. 10, 1910
Davies, David	June 10, 1911	Mottishaw, Sam. K.	Nov. 15, 1917
Davies, Stephen	Nov. 15, 1917	O'Brien, George	May 21, 1914
Davies, Thos. Owen	May 21, 1914	Ovington, John	May 27, 1913
de Hart, J. B.	May 17, 1917	Peacock, Frank David	Oct. 28, 1911
Derbyshire, James	Nov. 9, 1907	Penman, Hugh	May 21, 1914
Devlin, Henry	May 1, 1909	Phelan, Arthur	May 27, 1913
Dickson, James	Oct. 31, 1912	Powell, J. W.	June 10, 1911
Elliott, Daniel	Nov. 9, 1907	Quinn, John Graham	July 8, 1916
Emmerson, Joseph	Nov. 9, 1907	Ramsay, Peter Millar	May 16, 1918
Fairfoull, Robert	June 10, 1911	Roper, William	May 13, 1915
France, Thos.	Nov. 22, 1906	Russell, John	May 21, 1914
Fraser, Norman	Mar. 4, 1905	Shanks, John	May 1, 1909
Freeman, H. N.	May 1, 1909	Shaw, William	May 9, 1912
Galloway, C. F. J.	July 22, 1908	Shenton, T. J.	Sept 10, 1910
Garman, Morris W	Nov. 15, 1917	Shone, Samuel	May 1, 1909
Gascoyne, Rowland B.	May 21, 1914	Smith, A. E.	Oct. 28, 1911
Glover, Francis	Oct. 31, 1912	Smith, Joseph	July 22, 1908
Graham, Charles	Nov. 14, 1905	Smith, Thos. Edwin	Dec. 19, 1918
Graham, Thomas	Nov. 9, 1907	Spicer, J. E.	Oct. 28, 1911
Gray, James	Nov. 27, 1909	Spruston, T. A.	Nov. 27, 1909
Henderson, Robert	Nov. 27, 1909	Stevens, L. C.	Nov. 27, 1909
Hewlett, Howe	May 27, 1913	Stewart, R. T.	Sept. 10, 1910
Higgins, Alexander	Dec. 19, 1918	Strachan, Robert	Mar. 4, 1905
Holden, James	May 1, 1909	Strang, James	June 10, 1911
Howden, Archibald	May 27, 1913	Taylor, James	May 16, 1918
Howells, Nathaniel	Oct. 28, 1911	Thomas, J. D.	Sept. 10, 1910
Hughes, John C.	May 17, 1917	Thorne, B. L.	Sept. 10, 1910
Humphries, Clifford	June 10, 1911	Touhey, James	May 21, 1914
Hunter, Alex. B.	July 8, 1916	Walker, William	May 16, 1918
Jackson, Thos. R.	Nov. 9, 1907	Wallbank, J.	Sept. 10, 1910
James, William	July 22, 1908	Warburton, Ernest Leonard	July 8, 1916
Jaynes, Frank	May 13, 1915	Wark, Samuel David	Oct. 3, 1919
Jemson, Jas. W.	May 27, 1913	Wesnedge, William	Dec. 19, 1918
Kellock, George	June 10, 1911	Whittaker, John	Dec. 19, 1918
Knox, T. K.	July 27, 1909	Williams, John Samuel	Dec. 19, 1918
Laird, Robert	Nov. 15, 1917	Williams, Thos. B.	May 17, 1917
Leighton, Henry	May 9, 1912	Williams, Thos. H.	Nov. 22, 1906
Macauley, D. A.	June 10, 1911	Wilson, Ridgeway R.	Nov. 15, 1917
McCulloch, James	Sept. 10, 1910	Wilson, William	May 16, 1918
McDonald, John	Oct. 3, 1919	Wylie, John	July 22, 1908

SECOND-CLASS CERTIFICATES OF SERVICE.

NAME.	DATE.	Cer. No	NAME.	DATE.	Cer. No.
Lee, John S.	March 4, 1905	B 9	Hunt, John	March 4, 1905	B 13
Millar, J. K.	March 4, 1905	B 10	Walker, David	March 4, 1905	B 14
McCliment, John	March 4, 1905	B 11	Powell, William Baden	March 4, 1905	B 16
Martin, David	March 4, 1905	B 12	Bryden, Alexander	March 4, 1905	B 18

Second-class Certificates of Competency issued under "Coal-mines Regulation Act Further Amendment Act, 1904."

Name.	Date.	Cer. No.	Name.	Date.	Cer. No.
Adamson, Robert	Sept. 10, 1910	B 120	Garbett, Richard	Oct. 31, 1912	B 161
Allan, Alex. McDairmid	May 27, 1913	B 167	Garman, Morris Wilbur	Oct. 31, 1912	B 155
Almond, Walter	Nov. 15, 1917	B 213	Gilham, John	June 21, 1920	B 237
Ball, Benjamin	June 21, 1920	B 235	Gillespie, Hugh	July 29, 1905	B 24
Barclay, Andrew	July 29, 1905	B 23	Gillespie, John	Oct. 23, 1906	B 36
Barlow, Benjamin Robert	Dec. 19, 1918	B 229	Gould, Alfred	May 13, 1915	B 190
Baybutt, Thomas	July 8, 1916	B 206	Gourlay, Robert	Dec. 19, 1918	B 227
Bell, John	May 17, 1917	B 212	Graham, Chas	Mar. 4, 1905	B 1
Beveridge, William	June 21, 1920	B 233	Gray, David	May 1, 1909	B 76
Bevis, Nathaniel	Sept. 10, 1910	B 123	Gray, George	July 8, 1916	B 207
Biggs, John	May 1, 1909	B 94	Greenwell, Archibald	May 16, 1918	B 220
Biggs, John G	Nov. 2, 1907	B 40	Hamilton, Robert N	May 21, 1914	B 175
Blair, James	May 13, 1915	B 197	Hastings, Andrew Peacock	Dec. 19, 1918	B 223
Brace, Tom	Nov. 27, 1909	B 96	Henderson, Robert	July 22, 1908	B 60
Bridge, Edward	Oct. 23, 1906	B 33	Holliday, William	Dec. 19, 1918	B 230
Brown, David	Sept. 10, 1910	B 108	Horrocks, Abner G	June 10, 1911	B 130
Brown, George	Dec. 19, 1918	B 225	Howells, Nathaniel	Nov. 27, 1909	B 97
Brown, James L	Oct. 28, 1911	B 136	Huby, Norman W	May 13, 1915	B 198
Brown, John C	Oct. 23, 1906	B 39	Hudson, George	Sept. 10, 1910	B 121
Brown, John Todd	May 9, 1912	B 150	Hughes, John C	Sept. 10, 1910	B 109
Brown, R. J	Oct. 28, 1911	B 134	Hutton, Isaac	May 21, 1914	B 185
Brown, Robert	May 21, 1914	B 183	Hutton, John	May 9, 1912	B 154
Brown, Robert Sneddon	May 13, 1915	B 196	Hynds, William	Dec. 14, 1920	B 240
Brown, William Gold	Dec. 19, 1918	B 228	Jackson, Thos. R	Mar. 4, 1905	B 5
Brownrigg, John H	May 17, 1917	B 124	James, David	Nov. 2, 1907	B 58
Bushell, J. P	May 1, 1909	B 81	Jarrett, Fred	May 1, 1909	B 84
Carroll, Henry	July 22, 1908	B 62	Jaynes, Frank	Sept. 10, 1910	B 111
Caufield, Bernard	Oct. 23, 1906	B 30	John, Francis	July 8, 1916	B 200
Caufield, John	July 8, 1916	B 199	John, Howell	Sept. 10, 1910	B 122
Cawthorne, L	May 1, 1909	B 93	Johnson, Moses	May 1, 1909	B 75
Challinor, Jno. Thomas	May 27, 1913	B 169	Jones, Samuel	May 16, 1918	B 221
Challoner, Jno. Arthur	May 21, 1914	B 178	Jones, William T	July 22, 1908	B 66
Churchill, James	July 22, 1908	B 65	Jordon, Thos	Nov. 27, 1909	B 104
Clarkstone, Wm. W	May 21, 1914	B 180	Joyce, Walter	May 27, 1913	B 168
Commons, Wm	Sept. 10, 1910	B 115	Kirkwood, John Robertson	Oct. 31, 1912	B 160
Coupland, George	May 16, 1918	B 217	Knowles, James E	Oct. 28, 1911	B 137
Courtney, A. W	Oct. 28, 1911	B 138	Laird Robert	May 17, 1917	B 210
Cox, Richard	May 9, 1912	B 143	Lander, Frank	May 13, 1915	B 195
Crawford, David	May 1, 1909	B 88	Lane, Joseph	May 9, 1912	B 142
Cunliffe, Thomas	May 1, 1909	B 78	Lee, Robert John	Sept. 10, 1910	B 110
Dando, John	May 27, 1913	B 164	Littler, Matthew	Oct. 31, 1912	B 157
Daniels, David	Nov. 2, 1907	B 53	Luck, George	June 10, 1911	B 128
Derbyshire, James	Oct. 23, 1906	B 32	Manifold, Albert	May 9, 1912	B 145
Davidson, Hugh	May 27, 1913	B 165	Marsh, John	Nov. 15, 1917	B 216
Davies, Stephen	Sept 10, 1910	B 113	Mason, Joseph	May 13, 1915	B 193
Dennis, Fred. W	May 21, 1914	B 174	Massey, H	Nov. 27, 1909	B 99
Devlin, Ernest H	May 21, 1914	B 179	Mather, Thomas	June 10, 1911	B 127
Devlin, Henry	Nov. 2, 1907	B 44	Matusky, A	May 1, 1909	B 91
Dewar, Alexander	Oct. 31, 1912	B 162	Mayer, Ralph Waldo	May 9, 1912	B 144
Dickenson, Clifford	May 13, 1915	B 189	Mazay, W. J	Nov. 27, 1909	B 101
Dunsmuir, John	Nov. 14, 1905	B 26	Merryfield, William	July 22, 1908	B 61
Dykes, J. W	May 1, 1909	B 77	Miard, Hy. E	Sept. 10, 1910	B 107
Eccleston, Wm	May 1, 1909	B 87	Michek, John	May 17, 1917	B 188
Fairfoull, James	May 21, 1914	B 186	Michell, Dudley	May 13, 1915	B 187
Fairfoull, R	May 1, 1909	B 83	Middleton, Robert	July 22, 1908	B 72
Finlayson, James	July 29, 1905	B 21	Mitchell, Henry	July 8, 1916	B 201
Ford, Allan	May 27, 1913	B 171	Monks, James	Nov. 2, 1907	B 55
Foster, W. R	Nov. 27, 1909	B 102	Moore, Wm. H	May 21, 1914	B 173
France, Thos	May 14, 1905	B 27	Morgan, John	Nov. 2, 1907	B 43
Francesini, Louis	June 21, 1920	B 236	Morgan, William	Dec. 19, 1918	B 224
Francis, David M	May 21, 1914	B 182	Morris, John	July 22, 1908	B 67
Francis, Enoch	May 1, 1909	B 86	Morton, Robert W	July 22, 1908	B 59
Francis, James	July 22, 1908	B 63	Mottishaw, S. K	Oct. 28, 1911	B 135
Frater, George	July 8, 1916	B 204	Murray, George	Oct. 3, 1919	B 232
Freeman, Henry N	Nov. 2, 1907	B 45	Musgrave, J	May 1, 1909	B 90

SECOND-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Myers, Peter	May 9, 1912	B 149	Scarpino, Francis	Dec. 19, 1918	B 226
McLaughlin, Alex	May 13, 1915	B 191	Shanks, David	Oct. 31, 1912	B 159
McDonald, J. A	Oct. 28, 1911	B 133	Shaw, Thomas John	May 27, 1913	B 166
McDonald, John	May 27, 1913	B 172	Smith, John	Oct. 3, 1919	B 231
McFegan, W	Nov. 31, 1909	B 106	Somerville, Alex	Mar. 4, 1905	B 4
McGarry, Martin	Oct. 31, 1912	B 156	Spruston, Robert Lecce	July 8, 1916	B 202
McGuckie, Thomas M	Oct. 23, 1906	B 35	Spruston, Thos. A	Nov. 2, 1907	B 46
McKelvie, J	May 1, 1909	B 92	Stafford, Matthew	June 10, 1911	B 131
McKendrick, And	Sept. 10, 1910	B 112	Stewart, J. M	May 1, 1909	B 95
McLean, Michael D.	June 21, 1920	B 234	Stobbart, Jacob	May 9, 1912	B 153
McMillan, D	June 10, 1911	B 125	Stockwell, William	Nov. 2, 1907	B 56
McNay, Carmichael	May 9, 1912	B 151	Strang, Thomas	Oct. 31, 1912	B 158
McPherson, James E	July 22, 1908	B 73	Sutherland, John	May 16, 1918	B 218
Neen, Joseph	June 10, 1911	B 129	Taylor, James	May 13, 1915	B 194
Newbury, Arthur	May 21, 1914	B 184	Taylor, Thomas	July 8, 1916	B 203
Newton, Wm	Sept. 10, 1910	B 116	Thomas, J. B	Nov. 27, 1909	B 105
O'Brien, Charles	May 9, 1912	B 148	Thomas, Joseph D	Oct. 23, 1906	B 38
O'Brien, George	May 1, 1909	B 82	Thompson, Joseph	Sept. 10, 1910	B 114
Osborne, Hugh	Dec. 14, 1920	B 239	Touhey, James	May 9, 1912	B 147
Ovington, John	Nov. 2, 1907	B 52	Touhey, William	July 8, 1916	B 205
Park, William	June 21, 1920	B 238	Tonge, Thomas	July 22, 1908	B 71
Parkinson, T	May 1, 1909	B 80	Tully, Thomas	Nov. 15, 1917	B 214
Parnham, Charles	Nov. 2, 1907	B 49	Vanhulle, Peter	Nov. 2, 1907	B 54
Quinn, James	May 21, 1914	B 181	Virgo, John	May 1, 1909	B 89
Quinn, John	May 9, 1912	B 146	Walker, William	May 13, 1915	B 192
Ramsay, Peter Millar	May 17, 1917	B 209	Warburton, Ernest L	May 27, 1913	B 170
Rankin, Geo	Nov. 27, 1909	B 103	Watson, Adam G	Nov. 14, 1905	B 28
Raynes, M. T	Oct. 28, 1911	B 139	Watson, Arthur W	May 17, 1917	B 211
Reid, Wm	Oct. 28, 1911	B 132	Webber, John Frank	Mar. 4, 1905	B 3
Renny, James	Oct. 28, 1911	B 140	Wesnedge, William	Nov. 27, 1909	B 98
Richards, Thomas	Nov. 2, 1907	B 57	White, John	Nov. 2, 1907	B 48
Richards, Samuel	May 9, 1912	B 152	Whitehouse, William	Oct. 31, 1912	B 163
Rigby, John	July 29, 1905	B 29	Williams, John Samuel	Nov. 15, 1917	B 215
Roberts, Ebenezer	Sept. 10, 1910	B 117	Williams, Watkin	Sept. 10, 1910	B 118
Robinson, William	July 22, 1908	B 69	Wilson, Robinson	May 21, 1914	B 177
Rogers, George	May 1, 1909	B 79	Wilson, Thomas	July 22, 1908	B 74
Roper, William	May 9, 1912	B 141	Wilson, William	July 22, 1908	B 70
Rowbottom Thomas	May 16, 1918	B 222	Wood, Thos. James	May 21, 1914	B 176
Russell, John	Nov. 2, 1907	B 47	Worthington, Joseph	May 1, 1909	B 85
Rutherford, Jasper	May 16, 1918	B 219			

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Adamson, Robert	May 1, 1909	C 323	Ball, Benjamin	May 21, 1914	C 583
Ainsworth, Edward	May 16, 1918	C 674	Barker, Robert	June 10, 1911	C 415
Allan, Alexander	Oct. 28, 1911	C 430	Barlow, B. R	May 1, 1909	C 337
Almond, Alex	Oct. 1, 1907	C 252	Bateman, Joseph William	Oct. 28, 1913	C 551
Almond, Walter	July 22, 1908	C 286	Bauld, Wm	June 10, 1911	C 422
Anderson, John	Oct. 28, 1911	C 437	Baxter, Robert	Oct 28, 1911	C 450
Anderson, Peter Blane	Nov. 15, 1917	C 660	Baybutt, Thomas	May 27, 1913	C 548
Anderson, Robt	Oct. 14, 1914	C 599	Beeton, D. H	May 1, 1909	C 338
Angell, William	May 21, 1914	C 591	Bell, Fred	May 27, 1913	C 514
Arbuckle, John	May 13, 1915	C 622	Bell, John	May 9, 1912	C 477
Archibald, Geo	May 21, 1914	C 569	Bennett, Andrew M	Nov. 15, 1917	C 661
Archibald, Thomas	Oct. 28, 1911	C 454	Bennett, John	Oct. 14, 1914	C 597
Ball, Alfred	May 17, 1917	C 635	Bennie, John	June 10, 1911	C 411
Bann, Thomas	Oct. 31, 1912	C 494	Beveridge, Wm	June 10, 1911	C 396
Baggaley, J	July 22, 1908	C 300	Biggs, John	Mar. 4, 1905	C 210
Bain, James	May 27, 1913	C 546	Biggs, Thomas	Oct. 28, 1911	C 449

Third-class Certificates issued under "Coal-mines Regulation Act Further Amendment Act, 1904"—*Continued.*

Name.	Date.	Cer. No.	Name.	Date.	Cer. No.
Birchell, Richard	Oct. 1, 1907	C 266	Davis, William	May 1, 1909	C 339
Blair, James	Oct. 31, 1912	C 502	Dean, Andrew	Dec. 19, 1918	C 688
Blewett, Ernest	July 22, 1908	C 298	Dean, Joseph	May 13, 1915	C 611
Blinkhorn, Thomas	Dec. 19, 1918	C 681	Derbyshire, A	June 10, 1911	C 401
Bradley, William	July 22, 1908	C 291	Dewar, Alex	Sept. 10, 1910	C 369
Bridge, Edward	July 29, 1905	C 223	Devlin, Edward	Oct. 23, 1906	C 241
Briscoe, F	July 22, 1908	C 309	Devlin, Ernest Henry	May 27, 1913	C 538
Broderick, Matthew	Jan. 21, 1913	C 525	Devlin, John	Oct. 3, 1919	C 693
Brown, Arthur A	Oct. 14, 1914	C 596	Devoy, William	May 17, 1917	C 638
Brown, David	Nov. 1, 1909	C 348	Dickenson, Clifford	May 27, 1917	C 532
Brown, George	July 8, 1916	C 626	Dingsdale, Geo	Oct. 28, 1911	C 459
Brown, George A	Dec. 14, 1920	C 706	Doherty, J. J	May 1, 1909	C 340
Brown, James	Sept. 10, 1910	C 364	Doney, John	Mar. 4, 1905	C 211
Brown, James	June 10, 1911	C 412	Donnachie, John	June 10, 1911	C 425
Brown, James	July 8, 1916	C 625	Doodson, Robert	Oct. 28, 1911	C 455
Brown, Jas. Millie	May 13, 1915	C 615	Dorrance, Orlin William	Jan. 21, 1913	C 517
Brown, John	Sept. 10, 1910	C 392	Douglas, D. B	Oct. 23, 1906	C 235
Brown, Robert	Oct. 28, 1911	C 451	Dow, And. Y	May 21, 1914	C 587
Brown, Robert D	June 10, 1911	C 423	Drybrough, Robert	June 21, 1920	C 701
Brown, Robert S	June 10, 1911	C 408	Dunn, Wm	Oct. 14, 1914	C 606
Brown, Wm. A	May 21, 1914	C 576	Dykes, Isaac	June 10, 1911	C 409
Brown, William Gold	July 8, 1916	C 629	Dykes, Joseph W	Oct. 1, 1907	C 248
Bruce, Preston	Dec. 14, 1920	C 712	Eccleston, Thomas	May 17, 1917	C 482
Bullen, Thomas	Sept. 10, 1910	C 379	Edwards, John	May 27, 1913	C 542
Bushell, Jas. P	Oct. 1, 1907	C 264	Elliott, John	May 27, 1913	C 541
Bysouth, Thomas	May 16, 1918	C 673	Elmes, George	Oct. 31, 1912	C 511
Cairns, Andrew	June 10, 1911	C 420	Evans, D	July 22, 1908	C 284
Cairns, Robert	May 27, 1913	C 539	Ewing, Robert	May 13, 1915	C 608
Caldwell, Daniel	May 17, 1917	C 639	Fairfoull, James	Oct. 28, 1911	C 453
Calverly, Joseph	Sept. 10, 1910	C 375	Farrow, John William	Dec. 19, 1918	C 683
Camamile, Hollis	Oct. 28, 1911	C 443	Ferryman, Henry	June 21, 1920	C 697
Campbell, Samuel	Nov. 15, 1917	C 662	Fitzpatrick, T. J	Oct. 2, 1911	C 452
Campbell, Andrew	Nov. 27, 1917	C 651	Flockart, David	Jan. 21, 1913	C 531
Carr, Peter	Oct. 31, 1912	C 497	Ford, Allen	Oct. 28, 1911	C 445
Carson, George	Mar. 17, 1917	C 663	Fowler, Robert	Oct. 31, 1912	C 495
Catchpole, Charles	July 29, 1905	C 227	Francescini, Louis	May 16, 1918	C 672
Caufield, Edward	May 16, 1918	C 670	Francis, David Morgan	Oct. 28, 1913	C 558
Caufield, John	May 1, 1909	C 321	Francis, James	Oct. 1, 1907	C 250
Challoner, Arthur	Oct. 28, 1911	C 433	Frater, George	May 13, 1915	C 616
Chambers, Ralph H	Dec. 14, 1920	C 709	Freeman, H. N	Nov. 14, 1905	C 230
Charnock, John	Nov. 15, 1917	C 653	Frew, Andrew	Nov. 27, 1909	C 360
Cheetham, Ben	July 22, 1908	C 311	Frodsham, Vincent	July 22, 1908	C 282
Chester, John	Oct. 28, 1911	C 440	Furbow, John	Jan. 21, 1913	C 528
Clark, Lewis	June 10, 1911	C 405	Garbett, Richard	Sept. 10, 1910	C 377
Clark, Walter Pattison	May 9, 1912	C 480	Gascoyne, Rowland B	Jan. 21, 1913	C 513
Clarkson, Robert	June 21, 1920	C 696	Geater, Jas. Gordon	May 21, 1914	C 573
Clarkstone, Wm. W	Oct. 28, 1911	C 431	Gemmell, James	Oct. 31, 1912	C 505
Cleaves, Walter	May 9, 1912	C 475	Gillham, John	May 13, 1915	C 623
Clifford, William	July 22, 1908	C 313	Gillies, William	May 16, 1918	C 668
Colgrove, Charles Henry	Dec. 19, 1918	C 679	Glenn, James	Oct. 28, 1911	C 435
Commons, William	July 22, 1908	C 304	Gordon, Davis John	May 9, 1912	C 474
Cooke, Joseph	Mar. 4, 1905	C 209	Gourley, Robert	May 9, 1912	C 470
Coomb, Alexander	May 27, 1913	C 533	Gray, George	May 9, 1912	C 467
Cooper, John Andrew	Dec. 19, 1918	C 689	Green, William	Nov. 15, 1917	C 659
Cope, Frank	Oct. 28, 1913	C 549	Greenhorn, John	May 21, 1914	C 575
Coulthard, James	June 10, 1911	C 407	Griffiths, Edward	Oct. 31, 1914	C 508
Crawford, David	Mar. 4, 1905	C 208	Gunniss, Matthew	May 9, 1912	C 460
Cunningham, G. F	Nov. 11, 1905	C 229	Hallinan, William	May 1, 1909	C 343
Cunliffe, Thos	Oct. 1, 1907	C 265	Halsall, J	July 22, 1908	C 307
Dabb, Owen	May 21, 1914	C 578	Hamilton, John	Oct. 28, 1911	C 444
Dando, John	May 9, 1912	C 465	Hamilton, Robert Nesbitt	Oct. 28, 1913	C 550
Davidson, Hugh	May 9, 1912	C 464	Hampton, Samuel	Nov. 15, 1917	C 650
Davies, Alfred	Oct. 3, 1919	C 691	Hancock, Arthur	Nov. 15, 1917	C 656
Davies, Evan Thomas	May 9, 1912	C 463	Hardy, Edward	June 21, 1920	C 694
Davis, John David	May 16, 1918	C 669	Hartley, Thomas	Oct. 31, 1912	C 510

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Harwood, Fred	Sept. 10, 1910	C 384	Lynch, Stewart	Oct. 28, 1911	C 432
Harvey, Thomas	May 9, 1912	C 466	Mackie, John	June 10, 1911	C 421
Harvie, George	Sept. 10, 1910	C 378	Makin, J. Wm	Sept. 10, 1910	C 385
Heaps, Robert	Sept. 10, 1910	C 373	Malone, John	May 21, 1914	C 585
Hemer, Herbert	Oct. 14, 1914	C 595	Malone, Patrick	Oct. 1, 1907	C 247
Henney, Jonathan	June 10, 1911	C 424	Maltman, James	Oct. 31, 1912	C 501
Hendry, James	May 9, 1912	C 471	Mansfield, A	May 1, 1909	C 336
Herd, William	Dec. 19, 1918	C 682	Marrs, John	May 17, 1917	C 640
Heyes, Edward	May 1, 1909	C 320	Marsh, Daniel Parks	May 27, 1913	C 543
Hill, Isaac	Nov. 15, 1917	C 664	Marsh, John	Oct. 1, 1907	C 270
Hilley, Fred	July 22, 1908	C 290	Martin, James	June 10, 1911	C 398
Hilton, Mathias	Dec. 19, 1918	C 677	Mason, Joseph	July 22, 1908	C 297
Hilton, R. G	Sept. 10, 1910	C 376	Massey, Henry	May 1, 1909	C 317
Hodson, R. H	Mar. 4, 1905	C 216	Mather, Thomas	July 22, 1908	C 293
Holdsworth, William	May 16, 1918	C 671	Matusky, Andrew	Oct. 1, 1907	C 259
Holliday, William	July 8, 1916	C 634	Mawson, J. T	Nov. 27, 1909	C 359
Horbury, Joseph W	June 10, 1911	C 406	Maxwell, Geo	May 21, 1914	C 571
Horrocks, A. G	May 1, 1909	C 324	McAlpine, John	Mar. 4, 1905	C 217
Horwood, S	July 22, 1908	C 312	McArthur, John Malcolm	May 17, 1917	C 648
Houston, Robert	July 8, 1916	C 631	McBroom, Al	July 2, 1908	C 287
Howells, Nathaniel	May 1, 1909	C 316	McCourt, John	Oct. 14, 1914	C 605
Huby, Norman	June 10, 1911	C 394	McCulloch, James	May 1, 1909	C 315
Hutchison, Ben	Nov. 14, 1905	C 232	McDonald, John	Oct. 28, 1911	C 448
Hutchison, Fred	Nov, 27, 1909	C 358	McFagen, Alexander	May 9, 1912	C 490
Hynd, John	Dec. 14, 1920	C 707	McFegan, Robert	June 21, 1920	C 698
Hynds, William	July 8, 1916	C 632	McFegan, W	May 1, 1909	C 319
Ireson, John	Oct. 31, 1912	C 507	McGarry, Martin	May 1, 1909	C 326
Irvine, David	June 10, 1911	C 413	McGrath, James	July 8, 1916	C 630
Jack, John	May 21, 1914	C 582	McGuckie, Jno. M	May 21, 1914	C 562
James, Thos	May 21, 1914	C 588	McGuckie, Thomas	July 29, 1905	C 226
Jardine, George Edward	Jan. 21, 1913	C 521	McGuire, Thomas	Oct. 28, 1913	C 553
Jarrett, Fred. J	Oct. 1, 1907	C 256	McIntyre, Neil	May 21, 1914	C 574
Jaynes, Frank	July 22, 1908	C 277	McKelvie, J	July 22, 1908	C 285
Jemson, J. W	Mar. 4, 1905	C 205	McKenzie, Peter	June 10, 1911	C 427
Jenkins, John	Sept. 10, 1910	C 390	McKibben, Matthew	May 21, 1914	C 580
John, Howel	July 22, 1908	C 305	McKinley, John	Oct. 28, 1914	C 442
Johnson, Moses	Oct. 1, 1907	C 258	McLaughlin, James	May 9, 1912	C 485
Johnston, Robert	May 9, 1912	C 479	McLachlan, Alex	June 10, 1912	C 419
Jones, Alf. Geo	May 21, 1914	C 584	McLean, M. D	Sept. 10, 1910	C 389
Jones, Samuel	May 27, 1913	C 518	McLellan, William	Mar. 4, 1905	C 219
Jones, William C	Jan. 21, 1913	C 556	McLeod, James	July 22, 1908	C 296
Jones, William Ernest	Oct. 28, 1913	C 221	McLeod, John	May 13, 1915	C 609
Jones, W. T	Mar. 4, 1905	C 544	McMeakin, James	May 13, 1915	C 612
Joyce, Walter	Nov. 27, 1909	C 361	McMillan, D	Sept. 10, 1910	C 363
Judge, Peter	Sept. 10, 1910	C 391	McMillan, Edward	Oct. 31, 1912	C 493
Keenan, Wm. James	June 10, 1911	C 426	McMillan, Neil	Nov. 15, 1917	C 654
Kelly, Ernest	May 17, 1917	C 646	McNay, Carmichael	July 22, 1908	C 306
Kemp, Wm	Oct. 14, 1914	C 594	McNeill, Adam L	July 22, 1908	C 281
Kingham, Alfred	Oct. 28, 1913	C 559	McNeill, Robert	Sept. 10, 1910	C 387
Kirkeberg, H. S	Nov. 27, 1909	C 350	Meek, Matthew	May 9, 1912	C 484
Klejko, Steve	Dec. 14, 1920	C 703	Meikle, Harry Alexander	July 8, 1916	C 627
Lane, Joseph	Oct. 1, 1907	C 254	Menzies, Frederick	Dec. 14, 1920	C 704
Lavin, Joseph	June 21, 1920	C 700	Merrifield, George	Oct. 23, 1906	C 239
Leeman, T	May 1, 1909	C 345	Merrifield, William	Oct. 23, 1906	C 236
Lewis, Benj. J	Sept. 10, 1910	C 386	Michek, John	May 21, 1914	C 563
Leynard, Paul	May 17, 1917	C 637	Miles, John	June 10, 1911	C 414
Liddle, John	July 29, 1905	C 228	Mitchell, Charles	May 1, 1909	C 322
Lindsay, William	May 17, 1917	C 642	Mitchell, Henry	Sept. 10, 1910	C 366
Littler, John	June 10, 1911	C 410	Monks, James	Nov. 14, 1905	C 234
Littler, Matthew	June 10, 1911	C 417	Moore, George	Oct. 23, 1906	C 242
Littler, Robert	June 10, 1911	C 418	Moore, John	May 1, 1909	C 335
Livingstone, Alex	Oct. 28, 1911	C 436	Moreland, Thomas	July 22, 1908	C 299
Loxton, George	June 10, 1911	C 428	Morgan, John	July 29, 1905	C 224
Loxton, John	June 10, 1911	C 416	Morgan, William	May 17, 1917	C 636
Luck, George	May 1, 1909	C 318	Morris, David	May 9, 1912	C 472

Third-class Certificates issued under "Coal-mines Regulation Act Further Amendment Act, 1904"—*Continued.*

Name.	Date.	Cer. No.	Name.	Date.	Cer. No.
Mottishaw, Samuel K.	Oct. 23, 1906	C 237	Rutherford, Jasper	May 17, 1917	C 644
Murdock, Jno. Y.	May 21, 1914	C 564	Rutledge, Edwin	July 22, 1908	C 302
Myers, Peter	Oct. 28, 1911	C 446	Scott, Henry	July 22, 1908	C 294
Nanson, T. H.	July 22, 1908	C 280	Saunders, Eustace L.	Jan. 21, 1913	C 520
Nash, George William	May 17, 1917	C 565	Scarpino, Francis	May 17, 1917	C 649
Neen, Joseph	Nov. 27, 1909	C 352	Seddon, James	Oct. 3, 1919	C 692
Nelson, Horatio	Oct. 1, 1907	C 263	Shanks, David	Sept. 10, 1910	C 372
Neilson, William	May 9, 1912	C 481	Sharp, James	May 1, 1909	C 325
Newman, John	Oct. 14, 1914	C 603	Sharples, J. T.	Sept. 10, 1910	C 380
Nicholson, James	May 9, 1912	C 469	Shearer, L	May 1, 1909	C 330
Nimmo, James	May 9, 1912	C 461	Shields, Thomas	May 16, 1918	C 667
Norris, Joshua	Oct. 28, 1913	C 557	Shipley, John W.	Oct. 28, 1911	C 456
Oakes, Robert	Oct. 31, 1912	C 498	Shooter, Joseph	Oct. 1, 1907	C 261
O'Brien, Charles	Nov. 27, 1909	C 349	Shortman, J.	May 1, 1909	C 331
Odgers, Alfred	Jan. 21, 1913	C 529	Simister, J. H.	Nov. 27, 1909	C 353
Odgers, Eli	Jan. 21, 1913	C 523	Simister, W	May 1, 1909	C 334
Orr, Alexander	Oct. 28, 1911	C 434	Sim, James	Dec. 14, 1920	C 711
Osborne, Hugh	Oct. 28, 1913	C 555	Simms, Hubert Allan	Jan. 21, 1913	C 526
Oswald, Geo. L.	Sept. 10, 1910	C 370	Sinclair, William	Jan. 21, 1913	C 527
Owen, Thomas	May 1, 1909	C 347	Skelton, Thos	May 1, 1909	C 344
Park, William	Dec. 19, 1918	C 684	Smith, A. E.	Sept. 10, 1910	C 367
Parks, Alexander	Jan. 21, 1913	C 519	Smith, John Watterson	May 16, 1918	C 665
Parker, L.	May 1, 1909	C 341	Smith, Joseph	Mar. 4, 1905	C 207
Parkinson, James William	Nov. 15, 1917	C 655	Smith, Richard Beveridge	Oct. 28, 1913	C 561
Parkinson, T.	July 22, 1908	C 289	Smith, Thos. J.	Oct. 1, 1907	C 271
Parrott, Jas. E.	May 21, 1914	C 590	Smith, Thomas	May 9, 1912	C 486
Parson, Herbert	May 13, 1915	C 621	Smith, Thomas	Dec. 14, 1920	C 705
Pearson, Jonathan	May 9, 1912	C 473	Snow, Aubrey	June 15, 1918	C 675
Penman, Hugh	Oct. 28, 1913	C 552	Sopwith, Reginald Scott	Jan. 21, 1913	C 512
Perry, George Harewood	May 17, 1917	C 643	* Sparks, Edward	Oct. 1, 1907	C 255
Phillips, Richard Stephen	May 17, 1917	C 620	Spencer, G.	May 1, 1909	C 329
Pickup, A.	July 22, 1908	C 310	Spruston, R. L.	Nov. 27, 1909	C 355
Picton, W.	May 1, 1909	C 333	Spruston, Thomas A.	Mar. 4, 1905	C 206
Plank, Samuel	Nov. 14, 1905	C 233	Stafford, M.	Sept. 10, 1910	C 382
Poole, Samuel	May 27, 1913	C 536	Starr, Wallace	May 9, 1912	C 488
Price, Walter	Sept. 10, 1910	C 371	Staton, Edward	May 21, 1914	C 581
Puckey, John Thomas	Dec. 19, 1918	C 687	Steele, Walter	Oct. 28, 1911	C 439
Quinn, James	Oct. 28, 1911	C 441	Stewart, George	May 27, 1913	C 534
Quinn, John	Oct. 28, 1911	C 429	Stewart, James M.	Oct. 23, 1906	C 240
Radford, Albert	May 21, 1914	C 579	Stockwell, William	Oct. 23, 1906	C 238
Rallison, R.	July 22, 1908	C 279	Strachan, John	Oct. 14, 1914	C 604
Rankin, George	July 22, 1908	C 275	Strang, James	May 13, 1915	C 614
Rankin, Wm. Shaw	May 9, 1912	C 489	Strang, Thomas	June 10, 1911	C 400
Ratcliffe, Thomas	Oct. 1, 1907	C 253	Strang, Wm.	June 10, 1911	C 395
Raynor, Fred	Oct. 1, 1907	C 257	Sutherland, John	May 27, 1913	C 545
Reid, Robert	Sept. 10, 1910	C 383	Taylor, Charles M.	Mar. 4, 1905	C 213
Reid, Thos.	May 21, 1914	C 592	Taylor, Hugh	Jan. 21, 1913	C 530
Reid, Wm.	June 10, 1911	C 403	Taylor, James	May 21, 1914	C 567
Reilly, Thomas	July 22, 1908	C 303	Taylor, Jonathan	Dec. 19, 1918	C 680
Renney, Jas.	Nov. 27, 1909	C 354	Taylor, J. T.	Oct. 28, 1911	C 447
Richards, James	Nov. 1, 1907	C 249	Taylor, Leroy	Sept. 10, 1910	C 381
Richards, Samuel	Oct. 23, 1906	C 244	Taylor, Robert	June 21, 1920	C 695
Richardson, J. H.	Oct. 28, 1911	C 458	Taylor, Thomas	May 21, 1914	C 577
Rigby, John	July 29, 1905	C 225	Thacker, Geo.	May 27, 1913	C 537
Roberts, Ebenezer	May 1, 1909	C 327	Thomas, Thomas	Sept. 10, 1910	C 365
Robinson, Michael	May 1, 1909	C 332	Thomas, John B.	Nov. 14, 1905	C 231
Robson, Thomas	May 21, 1914	C 566	Thomas, Joseph	Mar. 4, 1905	C 220
Rogers, Ellis	May 13, 1915	C 624	Thomas, Warriett	Oct. 1, 1907	C 273
Roper, William	July 22, 1908	C 274	Thomason, Charles	Nov. 15, 1917	C 657
Ross, William	June 21, 1920	C 702	Thompson, Thomas	Oct. 1, 1917	C 267
Rowan, Alexander	Oct. 31, 1912	C 500	Thompson, John	Oct. 31, 1912	C 509
Rowan, John	Oct. 14, 1914	C 602	Thompson, Joseph	Oct. 1, 1907	C 269
Rowbottom, Thomas	Oct. 31, 1914	C 492	Thomson, Duncan	Mar. 4, 1905	C 218
Royle, Edward	Oct. 31, 1912	C 506	Tolley, John	Dec. 19, 1918	C 678
Russell, Robert	Nov. 27, 1909	C 351			

* C 314 issued in lieu of C 253 destroyed by Fernie fire.

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL-MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Touhey, William	May 27, 1913	C 547	Weeks, John	Mar. 4, 1905	C 214
Travis, Joseph	June 21, 1920	C 699	West, James Gloag	May 16, 1918	C 676
Tully, Thomas	May 9, 1912	C 468	Whalley, William	Dec. 19, 1918	C 686
Tune, Elijah	May 9, 1912	C 476	White James	Oct. 31, 1912	C 499
Turnbull, Matthew	Oct. 14, 1914	C 598	White, John	Oct. 22, 1906	C 245
Vardy, Robt	May 21, 1914	C 570	Whitehouse, Wm	June 10, 1911	C 402
Vaughan, John Henry	Oct. 28, 1913	C 560	Wilkinson, Edward	Oct. 28, 1911	C 438
Walker, George	July 8, 1916	C 633	Williams, John Sam	June 10, 1911	C 404
Walker, Jas. Alexander	Oct. 31, 1912	C 496	Williams, Watkin	June 22, 1908	C 301
Walker, Wm	May 21, 1914	C 586	Wilson, Robinson	June 10, 1911	C 397
Wallace, Fred	Oct. 1, 1907	C 260	Wilson, Thomas M	Oct. 1, 1907	C 272
Walls, John	Dec. 14, 1920	C 710	Wilson, William	Oct. 1, 1907	C 262
Warburton, Ernest Leonard	June 10, 1911	C 399	Wilson, William	May 17, 1917	C 674
Ward, Ernest Hedley	May 17, 1917	C 641	Winstanley, H	July 22, 1908	C 283
Wardrop, James	Oct. 31, 1912	C 504	Wintle, Thomas A	July 29, 1905	C 222
Watson, Adam G	Mar. 4, 1905	C 212	Witherington, George	Oct. 28, 1913	C 554
Watson, Arthur W	May 27, 1913	C 535	Wood, Thos. James	Oct. 31, 1912	C 491
Watson, George	July 22, 1908	C 288	Worthington, J	July 22, 1908	C 295
Watson, Joseph	Jan. 21, 1913	C 515	Wright, John	May 21, 1914	C 593
Watson, William	Oct. 22, 1906	C 246	Wright, Robert	May 21, 1914	C 589
Watson, William	May 17, 1917	C 645	Wright, William	Jan. 21, 1913	C 522
Webb, Herbert	Oct. 28, 1911	C 457	Young, Alexander	May 16, 1918	C 666
Webster, James Stewart	Dec. 19, 1918	C 685			

COAL-MINE OFFICIALS.

Third-class Certificates issued under "Coal-mines Regulation Act Further Amendment Act, 1904," sec. 38, subsec. (2), in exchange for Certificates issued under the "Coal-mines Regulation Act Amendment Act, 1901."

Name.	Date.	Certificate No.	Name.	Date.	Certificate No.
Adam, Robert	Oct. 12, 1904	C 42	Dudley, James	March 22, 1905	C 114
Addison, Thos	Dec. 10, 1904	C 52	Duncan, Thomas	Aug. 29, 1906	C 128
Aitken, James	Oct. 24, 1904	C 44	Dunlap, Henry	Nov. 21, 1904	C 51
Allsop, Harry	Oct. 11, 1904	C 34	Dunn, Geo	Dec. 19, 1904	C 56
Ashman, Jabez	Feb. 5, 1907	C 131	Dunsmuir, John	March 29, 1905	C 90
Auchinvole, Alex	March 29, 1905	C 89	Eccleston, Wm	March 15, 1905	C 80
Barclay, Andrew	April 27, 1904	C 19	Fagan, David	April 6, 1905	C 109
Barclay, James	April 27, 1904	C 20	Farquharson, John	April 27, 1904	C 17
Barclay, John	April 17, 1905	C 111	Findlayson, James	June 6, 1904	C 25
Bickle, Thos	Oct. 11, 1904	C 37	Fulton, Hugh T	April 3, 1905	C 105
Bowie, James	May 13, 1905	C 116	Gibson, Edward	May 30, 1905	C 118
Briscoe, Edward	Oct. 10, 1906	C 129	Gilchrist, Wm	March 29, 1905	C 85
Campbell, Dan	March 29, 1905	C 93	Gillespie, Hugh	April 6, 1904	C 8
Carr, Jos. E	Oct. 11, 1904	C 36	Gillespie, John	April 6, 1904	C 5
Carroll, Harry	March 29, 1905	C 98	Gould, Alfred	April 17, 1906	C 112
Clarkson, Alexander	April 27, 1904	C 18	Green, Francis	Oct. 11, 1904	C 38
Collishaw, John	Feb. 7, 1905	C 68	Handlen, Jas	June 16, 1904	C 122
Comb, John	March 23, 1904	C 2	Harmison, Wm	Feb. 3, 1905	C 65
Cosier, Wm	March 29, 1905	C 86	Hescott, John	Jan. 16, 1905	C 62
Courtney, A. W	Nov. 2, 1904	C 45	Hoggan, Wm	June 6, 1911	C 134
Crawford, Frank	April 6, 1904	C 7	Jonn, David	Nov. 8, 1904	C 49
Daniels, David	April 27, 1904	C 12	John, Evan	July 25, 1916	C 140*
Davidson, David	April 3, 1905	C 106	Johnson, Geo	May 9, 1904	C 124
Davidson, John	March 29, 1905	C 87	Johnson, Wm. R	March 1, 1905	C 75
Devlin, Henry	Oct. 12, 1904	C 41	Jones, Evan	April 30, 1913	C 136
Dobbie, John	Nov. 27, 1905	C 126	Kerr, Wm	March 29, 1905	C 91

Coal-mine Officials—*Continued.*

Name.	Date.	Certificate No.	Name.	Date.	Certificate No.
Lander, Frank	Jan. 9, 1905	C 61	Ross, John	April 3, 1905	C 101
Lanfear, Herbert	Jan. 27, 1905	C 63	Roughead, George	Jan. 30, 1907	C 130
Lewis, Thos	Oct. 11, 1904	C 35	Ryan, John	Dec. 28, 1904	C 59
Malpass, James	Nov. 7, 1904	C 113	Sanders, John W	April 3, 1905	C 107
Marsden, John	May 3, 1904	C 21	Shenton, Thos. J	July 25, 1904	C 30
Miard, Harry E	March 3, 1905	C 76	Shepherd, Henry	June 13, 1904	C 26
Middleton, Robt	Feb. 11, 1905	C 71	Smith, Geo	March 29, 1905	C 84
Miller, Thos. K	Feb. 21, 1905	C 74	Somerville, Alex	March 24, 1904	C 3
McKenzie, John R	Oct. 12, 1904	C 40	Stauss, Chas. F	Feb. 9, 1905	C 69
McKinnon, Arch'd	April 3, 1905	C 102	Steele, Jas	March 29, 1905	C 92
McMillan, Peter	March 29, 1905	C 94	Steele, John	June 4, 1913	C 4
McMurtrie, John	March 29, 1905	C 96	Stewart, Duncan H	March 28, 1904	C 137
Moore, Wm. H	June 17, 1905	C 119	Stewart, John	April 3, 1904	C 104
Morris, John	Dec. 27, 1904	C 57	Stewart, Daniel W	May 16, 1904	C 23
Myles, Walter	April 3, 1905	C 100	Stoddart, Jacob	Feb. 21, 1905	C 73
Nash, Isaac	June 1, 1904	C 120	Strachan, Robt	April 27, 1904	C 15
Neave, Wm	Oct. 12, 1904	C 43	Strang, James	April 27, 1904	C 10
Nelson, James	April 27, 1904	C 16	Sullivan, John	July 4, 1916	C 139
Nimmo, Jas. P	April 3, 1905	C 103	Summers, Joseph	May 17, 1920	C 141
Nimmo, Richard E	April 18, 1911	C 133	Thomas, John	March 29, 1905	C 97
O'Brien, Geo	Feb. 6, 1905	C 66	Vass, Robt	Dec. 12, 1904	C 53
Pearse, Thomas W. H	April 14, 1916	C 138	Vater, Charles	April 6, 1904	C 66
Perrie, James	March 15, 1905	C 81	Webber, Chas	Sept. 13, 1904	C 32
Power, John	Sept. 8, 1920	C 142	Webber, Charles F	Sept. 13, 1904	C 33
Price, Jas	Nov. 8, 1904	C 50	Whiting, Geo	May 29, 1905	C 117
Rafter, Wm	March 29, 1905	C 95	Wilson, Austin	Feb. 7, 1905	C 67
Reid, James	March 23, 1904	C 1	Wilson, Thos	April 27, 1904	C 11
Richards, Thos	April 27, 1904	C 14	Woodburn, Moses	March 29, 1905	C 83
			Yarrow, Geo	Nov. 3, 1904	C 46

* Issued in lieu of No. C 132, lost.

Mine Surveyor Certificates issued under the "Coal-mines Regulation Act Amendment Act, 1919."

Name.	Date.	Certificate No.	Name.	Date.	Certificate No.
Baile, Wynne Jeffreys	Oct. 3, 1919	16	Reger, Frederick William	Oct. 3, 1919	7
Bowerman, Everard S	Dec. 14, 1920	39	Richards, Charles Clifton	Oct. 3, 1919	19
Boyce, Joseph Patrick	Oct. 3, 1919	5	Richards, James A	Oct. 3, 1919	15
Davis, Gerald D	Oct. 3, 1919	28	Ridley, James	Oct. 3, 1919	18
Daniell, George W. B	Oct. 3, 1919	29	Roaf, Joseph Richardson	Oct. 3, 1919	14
Delaney, James	Oct. 3, 1919	21	Scott, Thomas Wright	Oct. 3, 1919	4
Dickson, James	Oct. 3, 1919	3	Strachan, Robert	June 21, 1920	36
Garman, Maurice Wilbur	Oct. 3, 1919	11	Townsend, Neville F	Nov. 17, 1919	31
Gregory, P. W	Nov. 17, 1919	32	Vallance, William Dixon	Oct. 3, 1919	8
Hargreaves, James	Nov. 29, 1920	33	Waddington, George W	June 21, 1920	35
Hepburn, James T	Dec. 14, 1920	37	Wark, Samuel David	Oct. 3, 1919	20
Holdsworth, William	Oct. 3, 1919	9	White, Harold	Oct. 3, 1919	25
Hughes, Edward	Dec. 14, 1920	38	Wilson, R. Robinson	Oct. 3, 1919	12
Hunter, George	Oct. 3, 1919	30	Wilson, Arthur Rupert	Oct. 3, 1919	13
King, Alfred George	Oct. 3, 1919	27	Wilson, Charles James	Oct. 3, 1919	22
Lancaster, Peter	Oct. 3, 1919	23	Wilson, Hartley Paul	Oct. 3, 1919	24
Lynn, Albert Crompton	Oct. 3, 1919	17	Wilkie, Octavius B N	Oct. 3, 1919	26
Miard, Harry Ernest	Oct. 3, 1919	2	Wilkinson, George	Oct. 3, 1919	1
McCulloch, Robert	Oct. 3, 1919	6	Wright, Austin	Dec. 14, 1920	40
Owen, William Arthur	Oct. 3, 1919	10			

INSPECTION OF METALLIFEROUS MINES.

KOOTENAY AND BOUNDARY DISTRICTS.

REPORT BY ROBERT STRACHAN, INSPECTOR.

I have the honour to submit my annual report as Inspector of Metalliferous Mines for the Kootenay and Boundary Districts for the year 1920.

The following mines were in active operation at some period during the year, but owing to the drop in the prices for metals the conditions were such that at the end a great many of the mine operators curtailed their working forces, and in many cases closed down the mines for the present. In the early part of the year labour troubles caused a very considerable reduction in the production of minerals, especially in the Slocan district.

NELSON DISTRICT.

In this district the *Eureka*, *California*, and *Molly Gibson* were worked during the early part of the year, but owing to unfavourable conditions operations were discontinued.

The *Mountain Chief*, *Yankee Girl*, and the *Nugget* mines were operated until the end of the year, but only in a small way.

TRAIL DISTRICT.

The *Le Roi* and *Centre Star* mines, owned by the Consolidated Mining and Smelting Company of Canada were operated all year, as well as the *Le Roi No. 2*, but, like the others, curtailed their forces in the latter part of the year.

The *Velvet-Portland* was reopened and operated until the end of the year by a small force of men who have an option.

SLOCAN DISTRICT.

The *Sovereign*, *Wonderful*, *Slocan Star*, *Van Roi*, *Metcor*, *McAllister*, *Noble Five*, *Queen Bess*, *Rambler-Cariboo*, *Ivanhoe*, *Bosun*, *Standard*, *Hewitt*, and *Ottawa* mines were working during the year, but, as previously mentioned, labour troubles interfered with the operations during the summer, and in the latter part, with the exception of the *Noble Five* and the *Slocan Star*, conditions were very quiet.

AINSWORTH DISTRICT.

In this district at the end of the year only the *Blue Bell* at Riondel was operating, and here the working force was reduced, while the *Highland*, *Florence*, and *Beatrice* were shut down for the time. The *Silver Bell*, *Index*, and *Silver Bear* were closed down and only a few men were at work on the *Whitewater*.

BOUNDARY DISTRICT.

The *Bell*, *Sally*, *Providence*, *Emma*, and *Rock Candy* mines were working during the year, the first three in a small way, while the *Emma*, owing to the demand for the ore as a flux, operated very steadily, and the *Rock Candy*, mining fluorspar, was very active during the entire year.

EAST KOOTENAY DISTRICT.

The *Sullivan* mine, the largest producer of minerals in the district, worked steadily during the whole year, both in the upper workings and in the new tunnel, and a small force was employed on the *St. Eugene* and the *North Star* mines.

During the year 170 visits of inspections were made and forty-two mines were visited, of which twenty-five had over twelve men employed underground and seventeen had less than that number. In the case of the mines employing the larger number of workmen inspections are made almost monthly.

There were a great many small mines operating, generally by parties who had obtained leases of the same, but owing to having received no notice of opening or reopening and the scattered nature of the district we were unable to visit them.

The conditions in and around the mines inspected were found fairly good, and where any defects or omissions were pointed out these were immediately remedied.

The explosives, which include all the various percentages of the Giant powders and Canadian Explosive Company's products, have generally been found to be kept in proper magazines, at suitable temperatures, and not more than sufficient for a day's work kept out. Both the main and temporary magazines at the mines are kept in very good condition, with proper tools for opening the containers, and no candles, matches, or open lights near. At the larger mines electric lights are used for illumination, which eliminates the use of open lights near the explosives. No accidents due to either the use or handling of explosives have been reported during the year, and this is good evidence that the regulations governing explosives are well complied with.

Cook and bunk houses have been found in very good condition, and in the case of some of the larger mines the provisions made for the comfort and convenience of the workmen are exceptionally good.

At the *Sullivan* mine during the year a new change-room has been provided, with steel lockers, showers, and up-to-date sanitary arrangements. Two new bunk-houses have also been built, with the view to having the workmen on one shift occupy one and the opposite shift the other; this arrangement reduces to a minimum the disturbance created when the change of shift occurs, an arrangement which could be copied with advantage in a great many camps.

Four fatal accidents were investigated during the year, of which three occurred in this district. The fourth occurred in Yale District, and as there was no Inspector convenient it was investigated from this office on receipt of your instructions. Coroners' inquests were held on three of the accidents, but in that which occurred in the rock-house at the *Sullivan* mine the Coroner decided that no inquest was necessary.

The causes of the accidents were: Deceased caught between the belt and driving-pulley in the rock-house at the *Sullivan* mine; falling down the shaft; cave of ground at the face; and run over by skip. In the case of the first no person saw the accident, and when one of the workmen in the rock-house visited the place he found the deceased caught between the belt and the pulley. Whether he fell from the floor above, where he was engaged in attending to a feed-chute, or whether he had gone down to obtain a crowbar and reached over across the pulley, is not known. Although in doubt as to whether the rock-house comes within the "Metalliferous Mines Inspection Act," I suggested that a better system of fencing off pulleys and belts should be adopted, and I am pleased to report that this course was followed.

The second accident occurred in the shaft at the *Centre Star* mine when one of the workmen came to the station where the skip was standing. The tender warned him that the skip was signalled away, but despite this the deceased attempted to get aboard, and while doing so the skip lifted away and he fell down the shaft. I think that some improvement along the lines of having more rigid gates, either on the skip or at the entrance to the shaft, would in some degree prevent this kind of accident.

The third accident occurred in the *Whitewater* mine and was due to the ground caving at the face of the entry. This mine was leased by a few workmen who were working it themselves and the place seemed to be fairly well timbered. I would like to point out that in this class of mine we have very little opportunity of making an inspection, unless after a fatal accident, owing to there being no notice given as to either opening, closing, or reopening, and no reports as to the minerals produced.

The fourth accident, which occurred in the *Nickel Plate* mine at Hedley, in the Yale district, was due to the skip coming down and running over skip-tender who had brought the other skip down and was crossing the incline for some purpose.

NICOLA-PRINCETON INSPECTION DISTRICT.

REPORT BY JOHN G. BIGGS, INSPECTOR.

I have the honour to submit my annual report as Inspector of Metalliferous Mines for the Nicola-Princeton District for the year ending 1920.

The mines operating during the year were: The *Iron Mask*, situated near the city of Kamloops, owned and operated by the Kamloops Copper Company, Limited; the *Copper Mountain* mines, situated near the town of Princeton, owned and operated by the Canada Copper Corporation; the *Nickel Plate* mine at Hedley, owned and operated by the Hedley Gold Mining Company, Limited; the *Horn Silver* mine, situated 15 miles south of Keremeos, owned and operated by Powell and Condit Bros.

Metalliferous mining in this district has not been active during the year owing to the unsettled condition of the market and the high cost of production, which has caused several of the mining companies to suspend operations. There has been a considerable amount of development during the year, and I refer more especially to the *Copper Mountain* property, and as soon as conditions warrant this district will be an important factor in the production of minerals.

There was one fatal accident reported during the year, which occurred at the *Nickel Plate* mine at Hedley in May, a report of which has been forwarded to the Department.*

Following is a brief description of the various mines in operation during the year:—

Iron Mask. A. Wallinder, superintendent. This property, consisting of the *Iron Mask*, *Erin*, and other claims, is situated about 7 miles south-east of the city of Kamloops at an elevation of 3,600 feet. Two shafts have been sunk which have been connected for ventilation purposes, the ore being hoisted through the Iron Mask shaft by means of skips by a 125-horse-power electrical hoist with a 1-inch steel cable, the lower level being reached at a depth of 750 feet. The mineral is copper in the form of sulphides and carbonates. The method of work is pillar and stope, the pillars being reduced to a minimum required to support the roof, and the ore is hauled from the ore-pockets along the levels by horse-haulage to the shaft; then hoisted to the surface and taken to the concentrator by a belt-conveyor.

The mine is well timbered, generally by square sets and stulls, and every precaution is taken to ensure the safety of the workmen. There is a good current of air circulating in this mine and it is kept in a good sanitary condition.

The power used is all electric, being transmitted to the mine over high-tension wires at a voltage of 11,000 from the city of Kamloops, and is transformed to 440 volts for use in and around the mine. Two compressors with a joint capacity of 1,100 cubic feet of free air a minute supply the power for the drills, and an electrical 3-ram force-pump is situated near the foot of the shaft on the 750-foot level for draining the mine.

Owing to the unsettled condition of the copper market this company suspended operations in April, and during the remainder of the year there has been a staff of workmen employed in renewals and improvements to the plant.

During the year a large concrete tank 50 feet in diameter was built at the mill, the mine frame was renewed and raised 9 feet, and a 2-compartment ore-bin, 12 by 20 feet, and a large storage water-tank were built.

There has been a large amount of work done to the *Iron Mask* shaft, which has been practically retimbered from the 100- to the 400-foot levels with 14-inch square sets.

Great trouble has always been experienced in having a good supply of pure water at this mine, which had to be hauled from Cherry creek by teams. During the year a 4-inch pipe-line was laid from the Thompson river and a 3-ram force-pump installed which will be used for pumping water into a storage-tank at the mine to be used for domestic and other purposes.

At the time of my inspections of this mine I have found the conditions to be good and the provisions of the "Metalliferous Mines Inspection Act" well complied with.

Horn Silver. Operated by Condit Bros. and Powell Bros., of Similkameen and Victoria. E. W. Condit, mine foreman. This mine is situated about 15 miles south of Keremeos and is reached by a fairly good wagon-road which is used for

* Described in Inspector Strachan's report.

transporting the ore from the mine to Similkameen Station. The mine is situated on the side of the mountain at an elevation of about 2,400 feet and 1,100 feet above the mine camp. The method of mining is pillar and stope. The roof being somewhat fragile necessitates a careful system of timbering, which is by posts and stulls, all the waste material being thrown into the gob and used as packing. The ore is brought out of the mine in small cars, dumped over a screen and sorted, where it is loaded into buckets attached to an aerial tramway 3,000 feet in length and transported to the foot of the tramway and dumped into a hopper, where it is loaded into wagons and teamed to Similkameen Station for shipment.

During my inspections I have generally found this mine to be well ventilated and timbered. The explosive used is 50-per-cent. Polar Forsite, which is stored in a magazine and only sufficient taken out for a day's supply. The only power used is a 50-horse-power gasolene-engine which is used for driving a compressor having a capacity of 102 cubic feet of free air a minute for running power-drills.

The cook-house, bunk-houses, office and other buildings, which are situated at the foot of the mountain, are maintained in a good and sanitary condition, water of a good quality being piped from a spring.

On account of the market conditions resulting in the reduced price of silver this company had curtailed its output, and on my last visit to this mine there were only eight men employed underground.

Copper Mountain.

J. A. McLaughen, superintendent. This mine, which is by far the largest and most important in this district, is situated on Copper mountain, in the Princeton district. It is owned and operated by the Canada Copper Corporation. During the year there has been a large staff of workmen employed in the construction of surface plant and the installation of modern and up-to-date machinery and equipment preparatory to commencement of operations for producing a large output of ore. The mine is well developed with enlarged haulage levels and the installation of dumping-stations and loading-chutes. During the year the railroad from Princeton to Copper mountain and the power-line from Greenwood have been completed, which have been large and costly undertakings.

The compressor plant has a capacity of 6,900 cubic feet of free air a minute, electrically driven. The head-frame, air-lines, hoist-room and hoist, concrete powder-magazine, large dining-hall, large rooming apartments, machine-shops, etc., comprise some of the construction during the year. At Allenby the large concentrating plant, which is capable of treating 2,000 tons of ore a day, has been completed and all machinery installed.

Owing to the unsettled condition of the copper market, resulting in the low price of copper, it has unfortunately been found necessary to suspend operations for the present.

This mine was only operated for a very short period during the year, and upon inspecting the same I found the ventilation to be good and the provisions of the "Metalliferous Mines Inspection Act" well complied with.

Nickel Plate.

G. P. Jones, general manager; Wallace Knowles, superintendent. This mine is situated at the top of Nickel Plate mountain at an altitude of 5,500 feet. It has been developed by means of tunnels driven through the country-rock until the ore-bodies have been reached. The No. 4 tunnel is the lowest of these and during the year all the ore has been handled through it. A large and well-timbered incline is driven off this level, termed the "Dixon incline," following the ore-body a distance of about 2,000 feet. Levels have been set off each 200 feet and air-shafts connecting these levels with the upper workings, thereby effecting a good current of air by natural ventilation.

The method of work is pillar and chamber, and due to the thickness of the ore, which is about 35 feet, it is necessary to commence on the foot-wall and work upwards, using the broken ore for the workmen to stand on. When the top is reached it is well barred down; the roof is extremely hard and very little timber is used.

All the ore mined during the year has been taken from the Dixon slope, which is fitted with a double track so as to deal with large quantities of ore. Two-ton skips are used, which are dumped into ore-pockets at the top of the incline, from which the cars are loaded and hauled in trips by trolly motors to the top of the gravity-tram, where the ore is again dumped into bunkers and loaded into skips on the gravity-tram and taken to the mill at Hedley. All the ore goes to the mill and no sorting is done either at the mill or the mine. The explosive used

is 60-per-cent. Polar Forsite and blasting is done by means of fuse and caps after the workmen leave the mine.

Unfortunately, owing to the high cost of production and gold having a standard value, this company decided to suspend operations in the latter part of the year until conditions become normal.

During my inspections of this mine I have always found the provisions of the "Metalliferous Mines Inspection Act" strictly adhered to and every endeavour being made to protect the workmen.

Good accommodation is provided for the employees, and the cook-house, bunk-house, and a large and commodious reading-room and wash-rooms are in a good and sanitary condition.

COAST INSPECTION DISTRICT.

REPORT BY JAMES DICKSON, INSPECTOR.

I have the honour to submit my annual report as Inspector of Mines for the above district during the year ending December 31st, 1920.

Britannia. E. J. Donohue, general manager; G. Nettleton, secretary-treasurer; C. P. Browning, superintendent. These mines, the property of the Britannia Mining and Smelting Company, are situated on Howe sound, about 28 miles from Vancouver, and are reached by a daily steamship service. Underground shrinkage stope mining was carried on throughout the year and glory-hole mining during the open months. The operations were in the *Bluff*, *Fairview*, *Empress*, and *Victoria* sections of the mine.

Considerable development-work was completed in the *Bluff* section on the 1,400-foot and 1,600-foot levels, opening up this body of ore for actual stoping; also a working-face on the 1,800-foot level is advancing towards the *Bluff* deposit from the main No. 1 shaft. A main transfer raise was completed for the direct handling of *Bluff* glory-hole ore from the surface to the 1,600-foot level, where with one handling it is delivered to the underground crushers.

In the *Fairview* section of the mine the sixth vein has been opened to the 1,600-foot level. Prior to 1920 this was known only to the 1,200-foot level. To the east of the *Fairview* the *Empress* section has been partially developed by crosscuts on the 1,600-foot level. A raise from this level is being driven for a connection with the 1,200- and 1,000-foot levels above.

The outside blacksmith and machine shop which had been maintained on the 1,000-foot level was abandoned and a first-class shop constructed at the portal of the 2,200-foot level tunnel. This shop is commodious and first-class equipment is installed therein, which permits of the economical handling of the mine-work. During the year two 6-ton Exide Cell storage-battery locomotives have been added to the previous equipment of twelve 3½-ton motors.

Included among the minor equipment additions was the purchase of an Armstrong Shuveloader to help out the shovelling operation. This unit is easy of operation and since being placed in service has worked most satisfactorily.

Development-work consisted of 7,581 feet, made up as follows: Raises, 1,454 feet; drifts, 2,825 feet; crosscuts, 2,208 feet; chutes, 1,094 feet.

The decline in price of copper necessitated the discontinuing of operations in the latter part of November, since when 250 men have been employed on a development programme. The railroad and tramway lines are being utilized for the transportation of a small tonnage daily to the stock-piles at the beach in order to maintain haulage facilities for the transportation of foodstuffs, etc., to employees residing at the Tunnel camp.

There is also maintained a force of twelve men on the work of driving a raise connection between the 4,100- and 2,700-foot level tunnels. This raise, when completed, will supplant the incline railway as an ore-carrier, and at December 31st it had attained a distance of 600 feet.

These mines are well ventilated; the 4,100-foot level and raise by means of two small exhaust-fans, in tandem, while the larger operation has natural ventilation, which in this case is very efficient. The mines are well timbered where required and strict attention is paid to bar down all loose rock after blasting. The powder used is low freezing and is handled with systematic care.

There were no fatal accidents during the year and very few serious ones, which says much for the supervision exercised by those in charge.

Clayburn.—During the year the mines at Clayburn, the property of the Clayburn Company, were inspected. The ventilation, which is natural, was good and the roadways and working-faces were well timbered and in safe condition. There were no accidents during the year.

NORTHERN INSPECTION DISTRICT.

Report by T. J. Shenton, Inspector.

I have the honour to submit my annual report for the Northern Inspection District, consisting of the Portland Canal, Nass River, Skeena, Queen Charlotte, and Atlin Mining Divisions.

ATLIN MINING DIVISION.

This section was visited by me during the month of July, and I found the following conditions to obtain:—

At the Ruby Creek underground and open placer mines, under the management of T. Daulton, the work was accomplished by a system of hydraulicking in the surface operation, and in the underground the material mined was taken out in small cars to the sluice-boxes. In both operations there were employed thirteen men, this number being less than the previous year, the reason for which, I was advised, was inability to get men. I found the prevailing conditions, both in operations and general arrangements of plant, to be quite in keeping with the requirements of safety and sanitation.

Boulder Creek Placers.—There are five small mines in operation on this creek—three open placers and two underground placers. At the head of the creek is situated the property of J. Black and J. Fraser, on which two large monitors were in operation washing down the gravel-bed, which is 30 feet thick. During the early part of the year five men had been employed, but at the time of my visit only two were employed.

Bumper Group.—This group of claims was next inspected, this being an open placer owned and operated by Gus Anderson. Five men were employed and the mining was accomplished by hydraulicking, one 7-inch monitor being in operation.

Immediately next in order down-stream I found F. Rich and his partner, A. Beatty, washing tailings in the old river-bed, and in the operation a 6-inch monitor was employed.

The next property inspected was that of Hill, Sanstrom & Co. It is an underground placer and is entered by a shaft 65 feet deep. Drifting along the river-bed had been done, amounting in all to 90 feet, and the hoisting of material was accomplished by a water-wheel geared to a small drum. Three men were employed and the timbering and ventilation were fair.

At the foot of Boulder creek is situated the underground placer owned by C. Miller & Co., which is entered by a slope to the old river-bed of 150 feet. Hoisting is done by a 12-horse-power oil-engine. The timbering of the slope was in fair condition, but the ventilation was inadequate. Three men are usually employed, but at the time I visited the mine it was idle.

Otter Creek Open Placer.—There is one mine only on this creek, which is owned by the Mines d'Otter Company. Three large monitors were in use in the operation at the time of my inspection. The placer is in charge of H. Maluin, general manager, and ten men were employed in the operation. I found the accommodation for living purposes to be sanitary and all other conditions to be satisfactory.

Pine Creek Open Placer.—This property is owned and operated by the Discovery Mining and Power Company. The operations are carried on under "lays" by three different groups of men employed, numbering at the time fourteen men. At the time of my visit two of the groups were engaged in mining virgin ground and the third was employed in washing tailings in the old river-bed. Eight large monitors were employed in the undertaking. Conditions relative to sanitation and matters of safety were reasonably satisfactory.

Spruce Creek.—The mines on this creek are chiefly underground placers, entered either by slope or shaft. At the time I visited these underground placers six different companies were in operation. These companies are as follows, beginning at the head of the creek:—

The property of J. Brown and J. McPherson, called the *Discovery* claim; it is entered by a shaft 60 feet deep and the workings possess about 200 feet of drifting. Timbering in shaft and roadways are very fair; ventilation is aided by a small fan. Three men were employed.

The next property was that of Isaac Matthews, called the *Lovel* group of leases. It is operated on "lay" by Beaton Bros. The mine is entered by a shaft 64 feet deep; the main drift from foot of shaft is 340 feet, and drifting parallel to the river-bed of 285 feet has been done. Six men were employed and I found the condition of timbering to be satisfactory, but the ventilation was sluggish and foul.

The next inspection was that of the *Croker* lease. Three men were employed; the mine is entered by a slope 80 feet long; drifting parallel to the old river-bed for 50 feet had been done. Timbering here was satisfactory and the ventilation, being natural, was fair.

The *Poker* claim was next inspected; it is entered by a shaft of 35 feet depth. The face of the pay-streak was in a distance of 600 feet from the foot of the shaft, where a drift at right angles had been driven 220 feet. Two men were employed; while the timbering was found to be fair, the ventilation was sadly foul and sluggish.

The *Peterboro* lease, owned by H. O. Morse and L. Shulz, was next visited; the slope is 300 feet in, and drifting at right angles along the river-bed both up and down the creek, a distance of 150 feet and 125 feet respectively, had been done. Two men were employed. In my examination I discovered a dangerous condition with respect to a portion of the main drift, where marked signs of extraordinary movement of the gravel-bed was seen in the breaking and shifting of the timbers. I immediately called the attention of Mr. Morse and his partner to it and gave orders that until this dangerous place had been made safe by taking out the broken timbers and reinforcing the others at this point, making it reasonably safe, no work at the face should be done.

The next and last underground placer was that of the *Chicago Bill* group. It is entered by a slope 85 feet in length and two men were employed. The ventilation, which is natural, I found to be fair and the timbering and other conditions fairly satisfactory.

Engineer.—I inspected this property on July 27th. Four men were employed at the time in keeping the property in repair and doing development-work. The work is in charge of Reggie Brooks, foreman, and I was advised by him that the property was under bond to the Ecla Copper Company, a corporation from the State of Nevada, U.S.A. I found all conditions having reference to the mine-workings, sanitation, ventilation, timbering, etc., also conditions of bunk-houses, cook-houses, etc., to be in strict keeping with the "Metalliferous Mines Inspection Act."

PORTLAND CANAL MINING DIVISION.

Salmon River Section.

About 16 miles in a northerly direction from tide-water of Portland canal is located the *Premier* mine, owned by the Premier Gold Mining Company, Limited. The company continued the work of development of the mine all through the year, and in addition employed a large number of men in work of construction. The mine is in charge of D. McDonald, foreman, and the whole operation is under the managership of L. Pitt, the general manager. A hydro-electric plant has been installed and is now in operation, and a mill, compressor-house, and other additional works of construction are nearing completion. Relative to the conditions in the mine and upon the surface, I may say that the company is rapidly moving in the direction of complying with all matters reasonably called for by the law, and I was advised that, as requested by me, provision with respect to medical aid and first-aid work would be properly provided for by the company.

Big Missouri and Joker.—At the time of my visit these properties had temporarily ceased operation, awaiting the putting-in of the new road now being built by the Government.

Bear River Section.

At the time of my visit in the fall of the year, through excessive fall of rain and melting snow from the hills, the river had swollen to the extent of overflowing its banks, and the torrent of water had carried away both the foot-bridge and the railroad-bridges across the Bear river, so that, except a visit to the *Bay View* group, I was unable to reach farther up the river. This property is situated in the range of hills immediately to the rear of the town of Stewart, a distance of about 2 miles. It is managed by F. Stanford and four men were employed doing development-work. All conditions of the operation from a standpoint of the law were satisfactory.

Swamp Point.—This mine is owned and operated by the Granby Consolidated Mining, Smelting, and Power Company and is situated about 30 miles south from Stewart, on the Portland canal. Operations of this mine from the beginning of the year continued until the month of August, when the mine ceased work because of an oversupply of lime that would be sufficient to meet all demands until the spring of the incoming year of 1921, when it is expected that operations will again commence. During the last three months of the year the operations were under the supervision of Bert Wing, and all conditions were carried on in strict recognition of the "Metalliferous Mines Inspection Act."

NASS RIVER MINING DIVISION.

Observatory Inlet.

At the head of the Observatory inlet and in the locality of Anyox are situated the following mines of the Granby Consolidated Mining, Smelting, and Power Company: *Hidden Creek*, *Rambler*, and *Granby Point*. The *Hidden creek* mine was operated continuously during the present year. J. Tuttle, Jr., is superintendent and J. Swanson is foreman of the mine.

This is the largest operation of the Northern Inspectorate, and with reference to the work of safety first in the prevention of accident it may be said that owing chiefly to the unwavering attention of the management no serious accident or fatality has occurred during the current year in connection with the mine's operation. During the year a large electric hoist has been installed in the mine at the head of the new shaft on the 385-foot level; the skips, of 6 tons capacity, are already put in and the shaft is now ready for hoisting.

Rambler.—This is a quartz mine and the product is used for fluxing at Anyox. The mine is managed by T. Oxley and employs on an average twenty men a day. All conditions with reference to safety, sanitation, etc., have been carefully observed by the management.

Granby Point.—This mine ceased operations temporarily at the end of January of the present year, as the company did not need the product at the time, which is used for fluxing purposes. The mine up to the time of the cessation was under the management of J. Lee. The prevailing conditions of operation were in recognition of the law.

Sylvester Bay.—Within this harbour and upon its shore, a distance of 3 miles in a southerly direction, is situated the property of the Golskeish Mines, Limited. Work on this property was commenced in May, 1920, and was in charge of W. H. Heidman. The product is quartz carrying some gold and silver and is shipped by the company to the smelter at Anyox, where it is used for fluxing. Thirteen men were employed and I found the conditions of the operation to be in accord with the "Metalliferous Mines Inspection Act."

Alice Arm Section.

From the head of this arm up the Kitsault river a distance of 18 miles are the mines operated by the Taylor Mining Company, Limited, consisting of the *Dolly Varden* and the *Wolf*. The mines began operation, including shipment of ore, about the month of May, and for the previous winter months the operation was simply that of development of the mines and making ready for operation when the heavy snows were cleared from the railway, hindering operation during these months.

The *Dolly Varden* mine is in charge of C. B. North as general manager for the company, with D. Tatrie as foreman. The number of men employed during the period of operation was as follows: Underground, 50; at mine surface, 25; on railway, 80; on construction-work, 20; hydro-electric contract, 50; making a total of 225. In the early part of December the railroad closed down owing to heavy falls of snow and a large number of the men were paid off. The first decision of the company with respect to continued operation of the mine after the stoppage of the railway was to proceed as they did the previous year to develop the mine; however, subsequently the property was closed down entirely. Great improvements have taken place with respect to the plant during the year and the output has been greatly increased. Large ore-bins have been erected near the wharves, at delivery terminal of railway, and two new bunk-houses have been constructed at the *Dolly Varden* mine.

Wolf.—A new hydro-electric plant was installed during the fall of the year near the *Wolf* mine, 3 miles from the *Dolly Varden* property in a northerly direction along the Kitsault river. The installation was completed in the month of December, when operation ceased. The plant

is capable of 500-horse-power development. Development of the *Wolf* mine proceeded until the end of November, when this was stopped. During this period twelve men were employed at the mine. In my inspections of both mines I found the conditions to be in accord with the "Metalliferous Mines Inspection Act."

North Star.—This mine joins the *Dolly Varden* mine along its north-eastern boundary and is owned by D. Zarelli and J. McAleenan. During the year a 3-drill compressor was installed, and at the time of my inspection six men were employed in developing the property. Conditions having reference to mine buildings, sanitation, and safety I found to be in accord with the "Metalliferous Mines Inspection Act."

OMINECA MINING DIVISION.

The *Blue Grouse* mine, owned by the Cassiar Crown Copper Company, was operated on a small scale during the present year for a period of eight months and closed down temporarily early in the month of November. The work consisted chiefly in drifting. No shipment of ore was made during the year and the average number of men employed a day was three. For present purposes the ventilation, timbering, etc., of the mine, and other conditions of plant, etc., are in accord with the requirements of the law.

Hudson Bay Mountain.

During the year I visited the different properties situated on this hill, including the *Victory* group of claims owned by Donald Simpson. Since the cessation of work on these claims in the fall of the year of 1919 nothing has been done.

Empire Group.—This group of claims, owned by Donald Simpson, is situated on the eastern slope of the hill. The owner has been engaged during the greater portion of the year in development-work, and a good trail is being built to the property by the Government.

Hazelton District.

Silver Standard.—Excepting for a period of about three weeks in the month of January, this mine operated continuously until November 20th, when it closed down. During the period of operation thirty-five men were employed. W. G. Norrie-Lowenthal is superintendent and R. J. Wall is foreman of the mine. In all my visits of inspection I found the prevailing conditions to be in full accord with the "Metalliferous Mines Inspection Act."

SKEENA MINING DIVISION.

Coast Section.

Drum Lummon.—I visited this mine during the early part of the present year, and at that time the operations were under the charge of J. Thom, acting-foreman. The mine is situated within Miskatlah harbour and is owned by the Drum Lummon Copper Mines, Limited. The locality is reached from Hartley Bay by launch, a distance of 25 miles, running east towards the head of Douglas channel. In all, nine men were employed, four in the mine and five on the surface.

A small amount of stoping had been done; a raise from the face of one of the old stopes was being driven to connect with the surface to aid the ventilation; it was up a distance of 60 feet at the time of my visit and was expected to reach the surface in a further distance of 20 feet. The plant consists of a Gibson mill of 40-ton capacity, one compressor driven by a 25-horse-power gasolene-engine, and a second gasolene-engine of 10 horse-power that operates the mill. In addition, fairly comfortable quarters were provided for the employees, a cook-house, and eating accommodation. All other conditions were in fair keeping with the law.

Surf Inlet.—This mine is situated on Princess Royal island and is owned and operated by the Belmont-Surf Inlet Mines, Limited. It was operated continuously throughout the year, but in the early months the fullest progress of the mine was interfered with by the scarcity of practical miners. A large number of houses and a new large modern building for bunk-house, together with a large hall for entertainment purposes, have been erected by the company during the year, and the camp now in every way is up to date in its accommodation.

The population of the camp is now about 300 and the average number of men employed by the company during the year was about 200. W. H. Holler is superintendent and the underground operations are in charge of C. P. Seale. The mine in its operation throughout is in accord with the "Metalliferous Mines Inspection Act."

QUEEN CHARLOTTE MINING DIVISION.

I made an inspection of the different operations on the Queen Charlotte islands early in the present year. On Moresby island and on the coast of Ikeda bay is situated the *Lily* mine of the Ikeda Mines, Limited. At the time of my visit only three men were employed and the mine was closed down. Operations, although only upon a very small scale, were very unsystematic. Of this I had on both occasions of my inspection advised the man in charge of the operations, J. Togunaga, the tendency being to increased hazard to life. A promise to remedy matters was offered as soon as Mr. Ikeda, the owner, came in, whom I had never been able to see.

Producer.—This mine is situated upon Jedway harbour and is owned by Ike Thompson. Five men had been employed in the mine until the end of March, when operations ceased, and at the time of my visit the property was still idle.

COAL-MINING IN BRITISH COLUMBIA.

By Wm. Fleet Robertson, Provincial Mineralogist.

During the year 1920 there was mined in the various collieries of the Province 2,696,774 tons (2,240 lb.) of coal, an increase from the preceding year of 287,826 tons, equivalent to about 11.9 per cent.

The output of coke was 67,792 tons as compared with 91,138 tons in 1919, a decrease of 23,346 tons or 26 per cent.

The following table shows, for the past ten years, the output and the *per capita* production of the various districts:—

Output and Per Capita Production of Various Districts.

Year.	District.	Gross Tons of Coal mined during Year.	Total No. of Employees at Producing Collieries.	Tons of Coal mined per Employee for Year.	Number of Men employed Underground in Producing Collieries.	Tons of Coal mined per Underground Employee for Year.
1911	East Kootenay District	442,057	2,197	201	1,585	272
	Coast District	1,855,661	4,676	397	3,627	511
	Whole Province	2,297,718	6,873	334	5,212	440
1912	East Kootenay District	1,261,212	2,410	523	1,780	708
	Coast District	1,764,497	4,720	374	3,495	504
	Whole Province	3,025,709	7,130	424	5,275	574
1913	East Kootenay District	1,331,725	2,666	500	1,965	678
	Coast District	1,239,035	3,777	328	2,865	433
	Whole Province	2,570,760	6,443	399	4,830	532
1914	East Kootenay District	955,183	2,397	399	1,749	547
	Coast District	1,211,245	3,335	363	2,518	481
	Whole Province	2,166,428	5,732	379	4,267	508
1915	East Kootenay District	852,572	1,748	488	1,183	721
	Coast District	1,120,008	3,230	347	2,512	446
	Whole Province	1,972,580	4,978	396	3,695	534
1916	East Kootenay District	882,270	1,674	527	1,125	784
	Coast District	1,603,310	3,386	474	2,569	624
	Whole Province	2,485,580	5,060	491	3,694	673
1917	East Kootenay District	551,751	1,481	372	944	584
	Coast District	1,846,964	3,689	501	2,816	656
	Whole Province	2,398,715	5,170	463	3,760	638
1918	East Kootenay District	732,864	1,327	552	814	900
	Coast District	1,845,860	4,100	450	2,844	645
	Whole Province	2,578,724	5,427	475	3,658	705
1919	East Kootenay District	558,806	1,369	409	1,000	559
	Coast District	1,850,142	4,597	402	3,145	588
	Whole Province	2,408,948	5,966	404	4,145	581
1920	East Kootenay District	847,389	1,582	536	1,062	798
	Coast District	1,849,385	4,767	388	3,129	591
	Whole Province	2,696,774	6,349	425	4,191	643

While no figures can be given as to the actual cost of mining in the different fields, the *per capita* production of these fields is of interest, as having a bearing upon the working costs and as indicating the mining facilities existing and the improvement made in these conditions from year to year.

The *per capita* production varies from year to year and this variation is very often caused by different conditions which last for a longer or shorter time. For example, explosions, new developments, and the opening-up of new mines or closing of old ones are variable factors which affect the *per capita* production from year to year.

It will be seen from the foregoing table that the production *per capita* was high in 1912, but that the years 1913, 1914, 1915, and 1919 show a decrease, especially in the Coast District. This decreased effectiveness, during the last few years, of the labour employed is largely due to the extension of the workings of the mines, causing a greater length of haulage and greater extent of old workings to be taken care of, but some of the increased labour is undoubtedly on account of the greater number of men employed in safeguarding the mine and workmen. In the year 1917 it will be observed that while the *per capita* output of the Coast collieries also shows an increase, the Crowsnest District shows a very considerable decrease, which is caused by the fact that a large amount of the underground labour in these collieries is engaged in non-productive work, such as repairing the damage from the former explosion and in opening up a new system of mining which it is expected will tend to greater safety of employees and also of the property.

It is gratifying to note the increased *per capita* production for 1920 shows a substantial increase over that of 1919, particularly in the East Kootenay District.

The market of the East Kootenay field is provided primarily by the railways of the south-eastern part of the Province and of the northern parts of the adjoining States of Montana and Washington, approximately three-quarters of the coal, sold as such, being exported to those States, while the remainder went to supply the demands of the south-eastern part of the Province —its domestic needs, its railways, steamboats, mines, and smelters. The competition of fuel-oil, frequently referred to in the past, has diminished to some extent owing to increased prices of fuel-oil.

Coke, a product of the coal-mines, is sold in the same markets, with the difference that the local consumption—chiefly by the smelter at Trail—took about 53 per cent. of the product, while 47 per cent. was exported to the States mentioned.

As regards the marketing conditions in this field, the East Kootenay collieries are, however, brought into direct competition with the collieries of Alberta, just over the Provincial boundary-line, all these collieries being in the same coalfield, with practically the same grade of coal and working under similar conditions.

The Coast District may be subdivided into two fields—the Nicola-Princeton field and the Vancouver Island field—in which the markets differ considerably.

The new coalfield on the Telkwa river, in Omineca Division, produced 1,400 tons of coal which was sold locally. The production of this field has been included in the Coast District.

In the Nicola-Princeton field the consumption is chiefly by the local railways, while a small amount finds its way to Vancouver, even under the handicap of what seems to be an excessively high freight charge.

The Vancouver Island coal market is provided by the domestic and manufacturing requirements of the Coast cities, and of the ocean-going steamers calling at these ports.

The larger coasting steamers and railways, which in later years have all been using California crude oil as fuel, are to some extent reverting to the use of coal, which will mean an increased production from Coast collieries.

As in former years, the greater proportion of the coal production was made by three larger companies—the Crow's Nest Pass Coal Company, with two collieries in East Kootenay; and by the Canadian Western Fuel Company, of Nanaimo, and the Canadian Collieries (Dunsmuir), Limited, these last two operating on Vancouver island.

In addition to these large collieries, shipments have been made by the Corbin Coal and Coke Company, in East Kootenay; by the Middlesboro Collieries, Fleming Coal Company (operating Coal Hill Colliery), Coalmont Collieries, Limited, in the Nicola Valley, and the Chu Chua Colliery, on the North Thompson river; by the Princeton Coal and Land Company, of Princeton, on Vancouver island; by the Pacific Coast Coal Mines, Limited, East Wellington Coal Company (formerly British Columbia Coal Mining Company, which was the Vancouver Nanaimo Coal Company), and Nanoose Collieries, Limited, near Nanaimo; and by Granby Colliery No. 1 at Cassidy. And Telkwa Collieries Company, of Telkwa.

The details of the shipments made by each of these companies will be found in reports of the Inspectors of the various districts.

During the year 1920 about 63 per cent. of the coal, sold as such by the collieries of the Province, was consumed in British Columbia; and the remainder was exported to the United States, including Alaska. Of the coke sold, about 60 per cent. was consumed in British Columbia, and the remaining 40 per cent. was exported to the United States.

COLLIERIES OF THE COAST DISTRICT.

The gross output of the Coast District collieries, including the Nicola valley and Telkwa, for the year 1920 was 1,849,385 tons (2,240 lb.) of coal actually mined, while some 58,769 tons was taken from "stock," making the actual consumption of coal 1,908,154 tons.

Of this gross consumption, 1,499,527 tons was sold as coal, 202,515 tons was consumed by the producing companies as fuel, and 206,112 tons was lost in washing. No coke was made this year by the Coast collieries but coal mined at some of the Vancouver Island collieries was sold to the Granby Company's Anyox smelter, where it was subsequently made into coke in by-product ovens by the Smelting Company for its own use.

Formerly, in 1902, the Coast Collieries exported to the United States 75 per cent. of their coal; in 1910 they exported thereto only 24.5 per cent. of their product, 71.3 per cent. of the output being consumed in Canada. In 1911, 76.1 per cent. of the coal was sold for consumption in Canada, 21.6 per cent. was exported to the United States, and 2.3 per cent. to other countries.

In 1912, 71.25 per cent. was sold for consumption in Canada, 21.25 per cent. exported to the United States, and 7.47 per cent. to other countries.

In 1913, 89.8 per cent. was sold for consumption in Canada, and the balance, or 10.2 per cent., was exported to the United States.

In 1914, 77.3 per cent. was sold for consumption in Canada, and the balance, or 22.7 per cent., was exported to the United States.

In 1915, 67 per cent. was sold for consumption in Canada, and the balance, or 33 per cent., was exported to the United States.

In 1916, 63 per cent. was sold for consumption in Canada, and the balance, or 37 per cent., was exported to the United States.

In 1917, 60 per cent. was sold for consumption in Canada, 37 per cent. exported to the United States, and 3 per cent. to other countries.

In 1918, 66 per cent. was sold for consumption in Canada, 30 per cent. exported to the United States, and 4 per cent. to other countries.

In 1919, 72 per cent. was sold for consumption in Canada, and the balance, 28 per cent., was exported to the United States.

In 1920, 79 per cent. was sold for consumption in Canada, 20 per cent. exported to the United States, and 1 per cent. to other countries.

COLLIERIES OF THE EAST KOOTENAY DISTRICT.

The gross output of the collieries of the East Kootenay District for the year 1920 was 847,389 tons (2,240 lb.) of coal actually mined, while 2,525 tons was added to stock, making the actual consumption of coal 844,864 tons. Of this gross consumption of coal, 684,418 tons was sold as coal, 58,797 tons was consumed as fuel by the producing companies, while 101,649 tons was converted into coke, producing 67,792 tons of coke; 269 tons of coke was added to stock, making the coke sales for the year 67,523 tons.

The East Kootenay collieries exported to the United States about 70 per cent. of the coal sold and about 47 per cent. of the coke.

The following table gives complete details of the coal and coke production of the Province for 1920, with the output figures for each colliery and district totals:—

Collieries of British Columbia—Production, 1920.

Mine.	Sold.			Total Sales.	Lost in Washing.	Used in making Coke.	Used under Co.'s Boilers, etc.	Total for Colliery Use.	Stocks.		Difference.		Output for Year 1920.
	In Canada.	In U.S.	Other Countries.						First of Year.	Last of Year.	Added to.	Taken from.	
Vancouver Island.													
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Canadian Collieries (D), Ltd—													
South Wellington	60,488	.....	.....	60,488	25,970	.....	3,851	29,821	.....	.....	.....	.....	90,309
Extension	92,611	46,717	.....	139,328	42,488	.....	15,557	58,045	2,426	1,458	.....	968	196,405
Cumberland	278,489	93,277	.....	371,766	79,186	.....	11,347	90,533	11,357	4,972	.....	6,385	455,914
Canadian Western Fuel Co.—													
No. 1, Nanaimo	176,577	62,447	3,488	242,512	.....	.....	48,078	48,078	24,096	3,946	.....	20,150	270,440
Harewood	93,708	33,140	1,851	128,699	.....	.....	42,492	42,492	21,080	7,170	.....	13,910	157,281
Reserve	80,483	28,463	1,590	110,536	.....	.....	25,468	25,468	435	.....	.....	435	135,569
Wakesiah	36,368	12,862	718	49,948	.....	.....	13,395	13,395	.....	.....	.....	.....	63,343
Nanoose-Wellington Collieries, Ltd.—													
Wellington	17,923	9,480	.....	27,403	.....	.....	4,200	4,200	113	1,010	897	.....	32,500
Pacific Coast Coal Mines, Ltd.—													
Morden	61,031	14,278	.....	75,309	13,479	.....	16,020	29,499	11,228	1,199	.....	10,029	94,779
Suquash	.....	.....	.....	.....	.....	.....	125	125	.....	.....	.....	.....	125
Granby Cons. M. S. & P. Co.—													
Cassidy	144,656	8,121	.....	152,777	44,989	.....	11,511	56,500	12,966	5,278	.....	7,688	201,589
East Wellington Coal Co	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals, Vancouver Island	1,042,334	308,785	7,647	1,358,766	206,112	.....	192,044	398,156	83,701	25,033	.....	58,668	1,698,254
Nicola-Princeton District.													
Middlesboro Collieries, Ltd	83,059	.....	.....	83,059	.....	.....	4,445	4,445	36	134	98	.....	87,602
Fleming Coal Co., Ltd	30,487	.....	.....	30,487	.....	.....	1,635	1,635	100	100	.....	.....	32,122
Princeton Coal & Land Co	15,616	1,464	.....	17,080	.....	.....	3,836	3,836	232	33	.....	199	20,717
Coalmont Collieries, Ltd	5,801	2,702	.....	8,503	.....	.....	480	480	1,000	1,000	.....	.....	8,983
Chu Chua Mine Syndicate	232	.....	.....	232	.....	.....	75	75	.....	.....	.....	.....	307
Totals, Nicola-Princeton District	135,195	4,166	.....	139,361	.....	.....	10,471	10,471	1,368	1,267	.....	101	149,731
Telkwa	1,400	.....	.....	1,400	.....	.....	.....	.....	.....	.....	.....	.....	1,400
Totals, Coast District	1,178,929	312,951	7,647	1,499,527	206,112	.....	202,515	408,627	85,069	26,300	.....	58,769	1,849,385
Crowsnest Pass District.													
Crow's Nest Pass Coal Co., Ltd—													
Coal Creek	58,546	338,466	.....	397,012	.....	....	34,749	34,749	98	120	22	.....	431,783
Michel	74,354	70,130	.....	144,484	.....	101,649	18,459	120,108	.....	.....	.....	.....	264,592
Corbin Coal & Coke Co., Ltd	72,176	70,746	.....	142,922	.....	.....	5,589	5,589	4,019	6,522	2,503	.....	151,014
Totals, Crowsnest Pass District	205,076	479,342	.....	684,418	.....	101,649	58,797	160,446	4,117	6,642	2,525	.....	847,389
Coal.													
Total for Province	1,384,005	792,293	7,647	2,183,945	206,112	101,649	261,312	569,073	89,186	32,942	.....	56,244	2,696,774
Coke.													
Total for Province (from Crowsnest Pass)	35,805	31,718	.....	67,523	.....	.....	.....	.....	312	581	269	.....	67,792

The following table shows the men employed at each colliery in the Province during 1920 and district totals:—

COLLIERIES OF BRITISH COLUMBIA—MEN EMPLOYED, 1920.

Mine.	White Men.																		Indians.			Japanese and Chinese.									Total Men employed.		
	Supervision and Clerical.			Miners.			Helpers.			Labourers.			Mechanics and Skilled.			Boys.			Labourers.			Miners.			Helpers.			Labourers.					
	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.	U.	A.	T.
Vancouver Island.																																	
Canadian Collieries (D), Ltd.—																																	
South Wellington	8	2	10	149	..	149	..	..	..	38	15	53	3	10	13	..	8	8	..	..	..	..	..	..	..	..	..	1	21	22	199	56	255
Extension	24	14	38	237	..	237	9	..	9	90	57	147	14	32	46	..	19	19	..	..	..	..	..	..	..	..	..	6	49	55	380	171	551
Cumberland	57	34	91	186	..	186	..	..	..	98	100	198	46	145	191	13	14	27	..	..	..	165	..	165	162	.	162	101	191	292	828	484	1,312
Canadian Western Fuel Co.—																																	
No. 1 Nanaimo	22	19	41	159	..	159	..	..	..	160	72	232	74	61	135	20	11	31	..	..	..	..	..	..	.	..	..	..	54	54	435	217	652
Harewood	8	14	22	91	..	91	..	..	..	38	55	93	17	42	59	6	11	17	..	..	..	..	..	..	..	..	..	..	21	21	160	143	303
Reserve	12	10	22	107	..	107	..	..	..	54	49	103	14	27	41	18	7	25	3	..	3	..	..	..	..	..	..	..	21	21	208	114	322
Wakesiah	6	5	11	53	..	53	..	..	..	24	28	52	14	10	24	8	4	12	..	..	..	..	..	..	..	..	..	..	11	11	105	58	163
Nanoose-Wellington Collieries, Ltd.—																																	
Wellington	1	5	6	102	..	102	40	..	40	18	28	46	2	29	31	..	..	..	..	..	..	..	..	..	..	..	..	..	15	15	163	77	240
Pacific Coast Coal Mines—																																	
Morden	10	5	15	86	..	86	18	..	18	70	9	79	..	31	31	12	4	16	..	..	..	..	..	..	..	..	..	..	35	35	196	84	280
Suquash	..	1	1	2	..	2	1	..	1	..	1	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3	6
Granby Cons. M. S. & P. Co.—																																	
Cassidy	4	10	14	125	..	125	..	..	..	68	51	119	7	25	32	.	10	10	..	..	..	..	..	..	..	..	..	..	..	..	204	96	300
East Wellington Coal Co	..	1	1	...	..	...	..	..	..	..	..	...	..	6	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	7
Totals, Vancouver Island	152	120	272	1297	..	1297	68	..	68	658	465	1123	191	419	610	77	88	165	3	..	3	165	..	165	162	..	162	108	418	526	2881	1510	4,391
Nicola-Princeton District.																																	
Middlesboro Collieries, Ltd	12	5	17	48	..	48	20	..	20	42	22	64	..	16	16	..	8	8	..	..	..	..	..	..	..	..	..	..	..	..	122	51	173
Fleming Coal Co., Ltd	4	2	6	24	..	24	..	..	..	6	20	26	4	5	9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	38	27	65
Princeton Coal & Land Co	4	5	9	14	..	14	5	..	5	15	7	22	..	7	7	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	38	21	59
Coalmont Collieries, Ltd	4	4	8	22	..	22	2	..	2	6	14	20	..	6	6	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	36	24	60
Chu Chua Mine Syndicate	2	..	2	7	..	7	2	..	2	..	2	2	..	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	11	5	16
Totals, Nicola-Princeton District	26	16	42	115	..	115	29	..	29	69	65	134	4	36	40	2	10	12	..	..	..	..	..	..	..	..	..	..	1	1	245	128	373
Telkwa	..	..	..	3	..	3	..	..	..	..	..	....	..	..	....	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	3
Totals, Coast District	178	136	314	1415	..	1415	97	..	97	727	530	1257	195	455	650	79	98	177	3	..	3	165	..	165	162	..	162	108	419	527	3129	1638	4,767
Crowsnest Pass District.																																	
Crow's Nest Pass Coal Co—																																	
Coal Creek	32	10	42	338	..	338	..	..	..	90	79	169	180	101	281	8	11	19	..	..	..	..	..	..	..	..	..	..	..	..	648	201	849
Michel	16	11	27	202	..	202	..	..	..	26	139	165	91	84	175	3	9	12	..	..	..	..	..	..	..	..	..	..	..	..	338	243	581
Corbin Coal & Coke Co	6	5	11	56	..	56	14	..	14	..	41	41	..	29	29	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	76	76	152
Totals, Crowsnest Pass District.	54	26	80	596	..	596	14	..	14	116	259	375	271	214	485	11	21	32	..	..	..	..	..	..	..	..	..	..	..	..	1062	520	1,582
Total for Province	232	162	394	2011	..	2011	111	..	111	843	789	1632	466	669	1135	90	119	209	3	..	3	165	..	165	162	..	162	108	419	527	4191	2158	6,349

NOTE.—U=underground; A=above ground; T=total.

CLASSIFICATION OF COAL.*

In Western Canada there is a great variety in the quality of the coals found, varying from a poor lignite, that goes to powder on exposure to the air, to a coal that approaches the Eastern anthracite, and great difficulty has been found in arriving at a classification which would properly cover such a wide range of fuels.

The United States Geological Survey some years ago made most extensive experimental investigations as to fuels, and has adopted a scale of classification, probably the most perfect known, based upon the relation between the total carbon and the total hydrogen in a coal; but this classification necessitates an ultimate analysis of each sample, a matter that can only be attempted in a very well-equipped laboratory, and but few records are available upon which to base a classification.

In a paper read before the Canadian Mining Institute, in March, 1908, D. B. Dowling, of the Geological Survey of Canada, suggested a scale of classification, which approximates the same relative scale, and is based upon the proximate analysis of a coal, by fast coking, on an air-dried sample, and combining both the fuel ratio and the moisture contents, and which he called the "Split Volatile Ratio."

$$\text{Split Volatile Ratio} = \frac{\text{Fixed Carbon} + \frac{1}{2}\text{ Vol. Combustible.}}{\text{Moisture} + \frac{1}{2}\text{ Vol. Combustible.}}$$

The resultant numerical value for the ratio as above indicated, if applied to the following scale, gives the class to which the coal belongs:—

Dowling's Scale of Split Volatile Ratio.

Anthracite	15 up.	Bituminous	3.5 to 6
Semi-anthracite	13 to 15	Low-carbon bituminous	3 to 3.5
Anthracite coal	10 to 13	Lignitic coal	2.5 to 3
High-carbon bituminous	6 to 10	Lignite	1 to 2.5

This ratio has been adopted in the Canadian Geological Survey Bulletin, "The Coalfields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia," and, as it appears to be the classification best suited to our present requirements, it has been adopted in this Report, and serves to give a standard definition to the many terms in use in describing coals.

In the accompanying Table of Analyses the source of the analysis is designated by a reference letter, and these references are given in the following table:—

Reference Letter.	Authority for Analysis.
A	Minister of Mines' Report, 1902, p. 262; sampled by Inspector.
B	Geol. Survey Report, Vol. XVI.
C	Chief Engineer, Crow's Nest Pass Coal Co.
D	E. J. Roberts, Gen. Manager, Corbin Coal and Coke Co.
E	B.C. Bureau of Mines.
F	Report by Dr. A. W. G. Wilson, McGill University, to C.P. Ry. Syndicate in 1905.
G	Can. Geol. Survey: Dowling's "Coalfields of Manitoba, Saskatchewan, Alberta, and Eastern BritishColumbia."
H	Prof. Milner Roberts, Washington Univ.; private letter.
I	Paper by Castleman, Can. Mining Inst.; analysis by Hersey, of Montreal.
J	Analysis by Bryant & Co., Vancouver.
K	G.C. Minister of Mines' Report, 1901, p. 1176.
L	Beological Survey Summary, 1907, W. W. Leach.
M	B.C. Minister of Mines' Report, 1905, p.p. 119 and 121.
N	Unpublished Analyses, B.C. Bureau of Mines.
O	B.C. Minister of Mines' Report, 1904.
P	Analysis by J. O'Sullivan, Vancouver.
Q	Memoir No. 26, G.S.C., Tulameen District.
R	Minister of Mines' Report, 1918, p. 125.
S	" " 1917, p. 124.
T	" " 1914, pp. 208 and 209.
U	" " 1912, p. 136.
V	" " 1912, pp. 90, 97, and 98.
W	G.S.C., Summary Report, 1912, p 98.

* This chapter was originally published in the Minister of Mines' Annual Report for 1909. As the 1909 Report is now out of print and as, since then, some new coalfields have been more or less developed, it seems advisable to reprint the chapter with the Table of Analyses revised and brought up to date.

TABLE OF ANALYSES OF BRITISH COLUMBIA COALS WITH CLASSIFICATION ACCORDING TO DOWLING'S "SPLIT VOLATILE RATIO."

Designation No.	Locality.	Seam.	Authority or Reference.	Prox. Analy. by Fast Coking.				Sulphur.	Coking Quality.	British Thermal Units.	Expanded Analysis Calc. on Clear Coal.			Split Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
				Moist.	V.C.M.	F.C.	Ash.				Moist.	V.C.M.	F.C.			
	Crow's Nest Pass Coalfield.															
1	No. 1 mine, Morrissey (Carbonado)	18 ft. thick	A	0.90	22.19	70.99	5.6	0.32	.....	14,346	0.97	23.60	75.43	6.8	High-carbon bit...	Highest seam worked, dip, 21° N.
2	No. 4 mine, Morrissey (Carbonado)	18 ft.	"	0.82	11.73	71.50	15.75	0.20	.....	12,858	0.98	13.96	85.06	11.5	Anthracitic coal ..	
3	No. 1 mine, Coal Creek.....	8 "	"	0.84	23.59	67.40	7.85	0.32	....	14,036	0.91	25.69	73.40	6.3	High-carbon bit...	
4	" 1 " " "	9 "	"	0.92	18.85	64.42	15.65	0.16	.....	13,757	1.10	22.40	76.50	7.1	" " "	
5	" 2 " " "	6 "	"	0.84	22.38	73.17	3.15	0.46	.....	14,935	0.88	23.21	75.91	7.0	.....	Dip 15° to E.
6	" 3 " " "	.....	"	0.92	20.63	72.05	6.00	0.40	.....	14,284	0.98	22.04	76.98	7.3	High-carbon bit...	
7	" 4 " " "	22 ft.	"	0.96	13.46	61.92	23.50	0.16	.....	12,114	1.25	17.63	81.11	8.9	" " "	
8	" 3 Michel.....	15 to 30 ft. thick..	"	1.00	20.57	72.00	6.15	0.28	.....	14,656	1.07	21.99	76.94	7.3	" " "	Highest seam worked.
9	" 4 " 80 feet below 3	10 to 30 " " ..	"	1.00	18.93	70.13	9.50	0.44	Good	13,850	1.10	21.00	77.90	7.6	" " "	
10	Marten Creek, Jubilee seam.....	30 feet thick.....	B	1.89	30.41	63.33	4.37	.....	....	14,447	1.98	31.80	66.22	4.6	Bituminous.....	
11	" " Peter "	. .....	"	1.79	33.04	61.55	3.62	.....	.....	14,490	1.86	34.28	63.86	4.3	"	
12	" " Cannel "	.....	"	2.10	57.71	30.33	9.86	.....	.....	.....	2.34	64.00	33.66	1.9	Cannel coal.....	
13	No. 1 mine, Coal Creek.....	9 ft. to 12 ft. thick	C	1.37	25.95	61.66	11.02	.....	.....	.....	1.54	29.17	69.29	5.2	Bituminous.	Av. of 9 samples from N. levels off incline.
14	" 1 " " "	" " "	"	1.37	27.22	63.02	8.39	.....	.....	....	1.50	29.71	68.79	5.1	"	Av. of 11 samples from S. levels off incline.
15	" 2 " " "	6 ft. thick	"	1.00	21.85	73.30	3.85	.....	.....	.....	1.05	22.72	76.23	7.0	High-carbon bit...	No. 3 West entry deeps.
16	" 2 " " "	5 ft. and 6 ft.....	"	1.00	24.30	69.70	5.00	.....	....	.....	1.05	25.58	73.37	6.3	" " "	Av. 13 samples No. 2 & 3 W. ent.
17	" 5 " " "	5 "	"	0 98	21.94	64.40	12.68	.....	.....	.....	1.12	25.12	73.76	6.3	" " "	Av. 31 samples. Av. of mine.
18	" 9 " " "	4 " and 6 ft.....	"	0.75	25.65	69.39	4.21	.....	.....	. .....	0.78	26.78	72.44	6.0	" " "	Av. 11 samples from main levels.
19	" 5 " Michel.....	5 " 6 in.....	"	1.20	19.55	67.75	11.50	....	.....	.....	1.35	22.10	76.55	7.1	" " "	Room 2 off 1 E. level, 1 E. incline.
20	" 5 " "	5 " 6 "	"	1.10	20.50	71.10	7.30	.....	.....	.....	1.20	22.10	76.70	7.2	" " "	" " " 2 W. " 1 W. "
21	" 3 " "	5 " 6 " to 7 ft...	"	1.01	20.95	69.00	9.04	.....	.....	....	1.12	23.04	75.84	6.9	" " "	Av. 8 samples, Rise workings.
22	" 8 " "	12 "	"	1.85	23.15	69.30	5.70	.....	.....	.....	1.96	24.55	73.49	6.0	" " "	R. 6 E. level, No. 3 incline.
23	" 8 " "	10 "	"	1.85	22.95	70.60	4.60	.....	.....	.....	1.94	24.06	74.00	6.1	" " "	R. 10, " " " "
24	" 8 " "	10 "	"	1.10	25.70	65.85	7.35	.....	.....	.....	1.19	27.73	71.08	5.6	Bituminous.	R. 34, No. 2 E. level.
25	" 8 " "	20 "	"	0.80	23.50	66.90	8.80	....	.....	.....	0.87	25.77	73.36	6.2	High-carbon bit...	R. 52, " " "
26	" 8 " "	30 "	"	0.92	23.50	67.46	8.12	.....	.....	.....	1.00	25.57	73.43	6.2	" " "	R. 49, " " "
27	" 8 " "	....	"	1.62	23.67	67.79	6.92	.....	....	.....	1.74	25.43	72.83	5.9	Bituminous.	Av. 23 samples, 3 E. and 3 W. main incline.
28	Corbin Coal & Coke Co., Corbin..	Special 10 ft. band	D	1.50	13.50	79.00	6.00	.....	.....	.....	1.60	14.36	84.04	10.4	Anthracitic coal ..	
29	" " " "	Average run of coal	"	2.00	22.00	66.00	10.00	.....	.....	.....	2.22	24.45	73.33	5.9	Bituminous.....	
	Upper Elk River Field.															
30	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 1, 14 feet.....	E	1.10	23.30	69.00	6.60	.....	Good	.....	1.18	24.95	73.87	6.3	High-carbon bit...	Sampled by Prov. Min. 1909.
31	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 3, 9 feet.....	"	0.90	22.40	64.40	12.30	.....	"	.....	1.02	25.55	73.43	6.2	" " "	" " " "
32	Headquarters Camp, Elk river, Lot No. 6047	....	"	0.90	17.00	73.70	7.50	.....	Fair ..	.....	0.97	19.35	79.68	8.3	" " "	" " " "
33	Northern Coal Co., Elk river	Outcrop..... ...	"	8.60	20.50	54.70	16.20	.....	Poor .	.....	10.26	24.46	65.28	3.4	Low-carbon bit ...	" " " "
34	Imp. C. & C. Co., Fording river..	A	"	1.40	19.10	71.40	8.10	.....	Good .	.....	1.52	20.78	77.70	7.4	High- " "	" " " "

TABLE OF ANALYSES OF BRITISH COLUMBIA COAL—*Continued.*

Designation No.	Locality.	Seam.	Authority or Reference.	Prox. Analy. by Fast Coking. Moist.	V.C.M.	F.C.	Ash.	Sulphur.	Coking Quality.	British Thermal Units.	Expanded Analysis Calc. on Clear Coal. Moist.	V.C.M.	F.C.	Split. Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
	Upper Elk River Field—Continued.															
35	Imp. C. & C. Co., Fording river	E	E	4.40	22.20	62.50	10.90	.....	Good	.....	4.94	24.91	70.15	4.7	Bituminous.	Sampled by Prov. Min., 1909.
36	Elk river. C.P.R. Syn., Lot 6980	Surface outcrop...	F	8.20	30.30	58.50	3.00	.....	Non..	.....	8.47	31.23	60.30	3.1	Low-carbon bit...	From Prospect workings.
37	" " " " 6047	" "	"	5.40	29.30	62.40	2.90	.....	"	.....	5.56	30.17	64.27	3.8	Bituminous.....	" " "
38	" " " " "	Deep cut	"	1.00	24.20	67.40	7.40	.....	C'k'ng	.....	1.08	26.13	72.79	6.0	High-carbon bit...	
39	" " " " "	" "	"	0.80	19.70	59.20	20.30	.....	"	.....	1.03	24.71	74.26	6.4	" "	
40	" " " " 6822	Shallow cut.....	"	2.00	18.80	69.60	9.60	.....	Non.	.....	2.21	20.79	77.00	6 9	" "	
41	" " " " 6824	" "	"	0.70	28.30	69.10	1.90	.....	Poor .	.....	0.71	28.86	70.43	5.6	Bituminous.....	
42	" " " " 6823	" "	"	0.80	26.70	63.30	9.20	.....	"	.....	0.88	29.41	69.71	5.4	"	
43	" " " " 6825	" "	"	3.80	15.20	77.90	3.10	.....	Slig'ly	.....	3.92	15.69	80.39	7.4	High-carbon bit...	
44	" " " " 6824	" "	"	0.80	26.30	65.10	7.80	.....	C'k'ng	.....	0.86	28.53	70.61	5.6	Bituminous.....	
45	" " " " 6823	" "	"	1.20	20.00	55.70	23.10	.....	"	.....	1.56	26.00	72.44	5.8	"	
46	" " " " 6646	Surface.....	"	6.80	23.00	57.10	13.10	.....	Non..	.....	7.83	26.46	65.71	3.7	"	
47	" " " " "	"	"	7.30	23.30	64.30	5.10	.....	"	.....	7.69	24.56	67.75	4.0	"	
48	" " " " 6647	"	"	12.8	30.90	36.50	19.80	.....	"	.....	15.96	38.52	45.52	1.8	Lignite.....	
	Coast District.															
49	Comox Union Colliery.	Upper seam.	G	1.34	30.01	65.82	2.83	.....	.....	.....	1.39	30.88	67.73	4.9	Bituminous.	
50	" " "	Lower seam	"	1.70	32.36	63.08	2.86	.....	.....	.....	1.75	33.31	64.94	4.4	"	
51	" Baynes sd. mine.....	Richardson seam..	"	1.18	34.13	48.51	16.18	.....	.....	.....	1.41	40.72	57.87	3.6	"	
52	Vancouver Id. No. 5 pit, Comox	Upper seam	A	1.08	29.24	57.03	9.60	3.05	.....	.....	1.23	33.48	65.29	4.6	"	
53	" Comox, Hamilton lake		"	1.70	22.82	47.72	27.00	0.76	.....	10,626	2.36	31.58	66.06	4.5	"	
54	No. 4 slope	Comox or low.seam	"	0.88	27.34	61.82	8.70	1.26	... ..	13,881	0.98	30.36	68.66	5.2	"	
55	" 5 pit.....	" " "	"	1.32	27.62	63.64	6.70	0.72	.....	14,191	1.42	29.84	68.74	5.1	"	
56	" 6 "	" " "	"	1.26	27.33	63.49	6.80	1.12	.....	14,191	1.36	29.68	68.96	5.1	"	
57	" 1 shaft, Esplan., Nanaimo	Up. se., dip 1 in 10E.	"	1.88	33.27	54.67	9.40	0.78	.....	12,672	2.10	37.04	60.86	3.8	"	
58	" " " "	Lo. seam, 1 in 10 E.	"	2.86	35.84	54.79	5.50	1.01	.....	12,951	3.06	38.33	58.61	3.5	"	
59	Harewood mine; dip 1 in 10 E...	.....	"	1.58	33.84	52.17	11.85	0.56	.....	12,238	1.80	38.64	59.56	3.7	"	
60	No. 5 Southfield mine.....	.....	"	2.08	35.78	56.26	5.60	0.28	.....	13,261	2.21	38.02	59.77	3.7	"	
61	Bottom vein, 15 to 20° S. 20° W.	Extension seam...	"	1.28	35.26	55.83	7.30	0.33	.....	13,199	1.38	38.17	60.45	3.8	"	
62	Top vein " " "	" "	"	1.24	36.49	53.72	8.20	0.35	.....	13,261	1.35	39.90	58.75	3.7	"	
63	Bottom seam, Tunnel vein (Report, 1902)	S. 12° W. dip 10°..	"	1.52	35.27	57.04	5.85	0.32	.....	13,416	1.62	37.58	60.80	3.9	"	
64	Top seam, Tunnel vein (Report, 1902)	" "	"	1.44	31.40	46.18	20.65	0.33	.....	11,401	1.82	39.74	58.44	3.6	"	
65	Nanaimo, Wellington mine.....	.....	G	2.75	38.03	52.64	6.58	.....	.....	12,567	2.95	40.70	56.34	3.3	Low-carbon bit...	
66	" New Vanc. C. Co.....	Commercial coal..	"	2.06	34.07	56.94	6.67	0.25	.....	.....	2.21	36.61	61.18	3.8	Bituminous.....	
67	" No. 5 Southfield.....	.....	A	2.08	35.78	56.26	5.60	0.28	.....	13,261	2.21	38.02	59.77	3.7	"	
68	" Wellington mine	Commercial samp.	G	8.57	25.30	56.40	9.52	0.21	.. ...	.....	9.50	28.02	62.48	3.2	Low-carbon bit...	
69	Nicola, Middlesboro Colliery.....	Coal Gully.....	"	3.04	37.18	52.05	7.73	.....	Good.	.....	3.29	40.30	56.41	3.2	" "	
70	" Lot 1267	Quilchena creek ..	"	6.95	37.21	47.95	7.89	.....	"	.....	7.54	40.40	52.06	2.6	Lignitic coal.....	
71	"	Coldwater.....	"	3.17	35.73	55.25	5.85	.....	"	.....	3.36	37.96	58.68	3.4	Low-carbon bit...	
72	" Coldwater.....	6 ft. seam	"	2.13	27.99	59.66	10.22	.....	"	.....	2.37	31.18	66.45	4.5	Bituminous.....	
73	"	Coal Gully.....	"	3.35	26.55	59.30	10.80	.....	"	.....	3.76	29.76	66.48	4.3	"	

TABLE OF ANALYSES OF BRITISH COLUMBIA COAL—*Continued.*

Designation No.	Locality.	Seam.	Authority or Reference.	Prox. Analy. by Fast Coking.				Sulphur.	Coking Quality.	British Thermal Units.	Expanded Analysis Calc. on Clear Coal.			Split Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
				Moist.	V.C.M.	F.C.	Ash.				Moist.	V.C.M.	F.C.			
	Coast District—Continued.															
74	Nicola Coal Hill Synd	Av. of 3 seams	H	5.58	37.81	50.77	5.84	.....	.....	.....	5.92	40.16	53.92	2.80	Lignitic coal	Av. of 5 analyses.
75	" Diamond Vale Colliery	Lump	"	2.66	37.84	55.14	4.36	.....	.....	.....	2.78	39.57	57.65	3.40	Low-carbon bit	
76	" Val. C. & C. Co., Nicola	No. 1	"	4.69	36.89	51.06	7.36	.....	.....	.....	5.06	39.82	55.12	3.00	"	
77	" " " " "	" 5	"	3.44	38.86	49.24	8.46	.....	.....	.....	3.76	42.45	53.79	3.00	"	
78	Princeton Coal and Land Co., Princeton Colliery	By B. of M.	E	16.40	31.70	45.10	6.80	.....	.....	.....	17.60	34.00	48.40	1.89	Lignite	
79	Princeton Coal and Land Co., Princeton Colliery	.....	J	10.45	36.77	45.60	6.42	0.76	.....	.....	11.25	39.62	49.13	2.21	Lignitic coal	
80	Princeton Coal and Land Co., Princeton Colliery	Av. of seam by P.M.	K	11.97	30.49	49.21	8.33	.....	.....	.....	13.06	33.26	53.68	2.40	" "	
81	Coalmont Collieries	Granite creek	Q	2.97	31.28	52.49	13.26	.....	Str'ng	.....	3.42	36.07	60.51	3.60	Bituminous	
82	" "	Collins Gulch	"	4.87	36.86	50.99	7.28	.....	T'nd'r	.....	5.25	39.75	55.00	3.00	Low-carbon bit.	
	Northern Interior.															
83	Telkwa river	5 ft. 6 in	L	1.36	10.87	80.82	6.95	.....	.....	.....	1.46	11.68	86.86	12.70	Anthracitic coal.	
84	" "	7 " 3 "	"	0.80	11.10	78.90	9.20	.....	.....	.....	0.88	12.22	86.90	13.30	Semi-anthracite.	
85	" "	4 " 0 "	"	0.60	10.80	82.70	5.90	.....	.....	.....	0.64	11.48	87.88	14.60	" "	
86	" Goat cr., Cassiar C.C.	14 ft	M	6.60	29.00	56.90	7.50	.....	.....	.....	7.13	31.36	61.51	3.40	Low-carbon bit.	
87	" " Transcontinental Dev. Synd.	28 in	"	0.80	8.20	81.60	9.40	.....	.....	.....	0.88	9.06	90.06	17.50	Anthracite.	
88	Telkwa river	Goat creek, 8 ft. thick.	R	0.60	33.90	56.00	9.50	.....	.....	.....	0.67	37.46	61.87	4.20	Bituminous.	
89	Morice river, Bulkley valley	.....	N	2.70	22.90	68.80	5.60	.....	Non..	.....	2.86	24.26	72.88	5.60	"	
90	Jefferson-Dockrill field	Average	S	2.50	30.50	60.80	6.20	.....	Fair..	.....	2.66	32.52	64.82	4.30	"	
91	Zymoetz River field	9-foot seam	T	3.30	34.50	56.10	6.10	.....	"	.....	3.51	36.74	59.75	3.60	"	
92	" " "	6-foot seam	"	3.10	31.30	55.30	10 30	.....	"	.....	3.46	34.89	61.65	3.80	"	
93	Fraser river, near Quesnel	.....	N	14.60	37.30	43.40	4.70	.....	Non..	.....	15.32	39.14	45.54	1.80	Lignite	
94	" " 30 m. below Quesnel	.....	"	27.90	28.60	34.50	9.00	.....	"	.....	30.65	31.43	37.92	1.10	"	
95	Queen Char. Ids., Camp Wilson	No. 1 surface	O	1.33	17.22	61.96	19.49	.....	.....	.....	1.66	21.38	76.96	7.10	High-carbon bit.	
96	" " " " "	" 3 "	"	2.01	9.13	86.06	2.80	.....	.....	.....	2.07	9.39	88.54	13.70	Semi-anthracite.	
97	Tumbo Island	.....	P	1.50	41.00	50.50	6.00	1.00	.....	.....	1.60	44.00	54.30	3.20	Low-carbon bit.	
98	Peace River field	2 ft. 3 in	U	1.80	23.90	67.80	6.50	.....	Fair..	.....	1.92	25.50	72.52	5.80	Bituminous	
99	" " "	2 " 8 "	"	1.60	15.90	77.45	5.10	.....	Non..	.....	1.70	16.80	81.50	8.90	High-carbon bit.	
100	Groundhog field	Godfrey tunnel	V	2.30	5.10	71.10	21.50	.....	.....	.....	2.94	6.50	90.56	15.10	Anthracite	Sampled by Prov. Min.
101	" "	Telfer series	"	2.62	6.96	84.49	5.93	5.75	.....	13,814	2.78	7.42	89.80	14.40	Semi-anthracite.	" " G. W. Evans.
102	" "	.....	"	2.97	5.59	65.60	25.84	1.90	.....	11,520	4.00	7.54	88.46	12.00	Anthracitic coal.	" " " "
103	" "	Klappan	.....	4.48	9.98	63.48	22.06	.....	.....	.....	5.75	12.81	81.44	7.20	High-carbon bit.	

INSPECTION OF COAL-MINES, 1920.

The coal-producing areas of the Province are divided into the Coast District, which includes the Vancouver Island, the Nicola-Princeton, and the Telkwa coalfields, and the East Kootenay District.

COAST DISTRICT.

This district, comprising, as it does, the coalfields of Vancouver island and the Coast, as well as those of the Nicola and Similkameen valleys, has been subdivided, for inspection purposes, into three Inspection Districts.

Two of these Inspection Districts are on Vancouver island, with headquarters for both at Nanaimo, which permits of one of the Inspectors being constantly at headquarters while the other is making inspections; it also permits of the interchanging of inspection duties, so that each Inspector knows both districts.

The third district is the Nicola-Princeton Inspection District, with headquarters at Merritt. In June, 1920, John G. Biggs was appointed to the inspectorate of this district.

NANAIMO INSPECTION DISTRICT.

HENRY DEVLIN, INSPECTOR (OFFICE, NANAIMO).

The Canadian Collieries (Dunsmuir), Limited—Nos. 1, 2, and 3 mines, all worked from what is known as the No. 1 tunnel, and No. 5 mine at South Wellington.

Granby Colliery No. 1 at Cassidy—3 slopes.

Pacific Coast Coal Mines, Limited—The Morden mine.

Nanoose Collieries, Limited—No. 1 mine.

Canadian Western Fuel Company—Harewood, Reserve, and Wakesiah.

East Wellington Coal Company.

Adit mine, Old Wellington Colliery.

COMOX INSPECTION DISTRICT.

(INCLUDING NO. 1 AND PROTECTION SHAFTS, NANAIMO.)

THOMAS R. JACKSON, INSPECTOR (OFFICE, NANAIMO).

Canadian Western Fuel Company—Protection and No. 1 mines.

The Canadian Collieries (Dunsmuir), Limited—Nos. 4 and 7 slopes and No. 5 shaft.

Pacific Coast Coal Mines, Limited—Suquash Colliery.

NORTHERN INSPECTION DISTRICT.

T. J. SHENTON, INSPECTOR (OFFICE, PRINCE RUPERT).

The Telkwa Collieries—Mine at Telkwa.

NICOLA-PRINCETON INSPECTION DISTRICT.

JOHN G. BIGGS, INSPECTOR (OFFICE, MERRITT).

The collieries operating during the year in this Inspection District, including the new mines that have been started, were:—

The Middlesboro Colliery of the Middlesboro Collieries, Limited, Merritt—Nos. 2, 3, 4, 5, 6, and 7 mines.

Fleming Coal Company.

Princeton Coal and Land Company's Princeton Colliery—No. 1 slope.

Coalmont Collieries.

Chu Chua Colliery.

EAST KOOTENAY DISTRICT.

The East Kootenay District is subdivided into two Inspection Districts—i.e., Northern Inspection District and Southern Inspection District. Both these districts are inspected by Robert Strachan as Senior Inspector, and John McDonald, Inspector with headquarters at the Mine-rescue Station at Fernie.

The collieries operating during the year were Coal Creek Collieries, Michel Colliery, and Corbin Colliery.

NANAIMO INSPECTION DISTRICT.

REPORT BY HENRY DEVLIN, INSPECTOR.

I have the honour to submit my annual report for the year ending December 31st, 1920, on the various coal-mines in my inspectorate, consisting of the Reserve, Harewood, and Wakesiah mines of the Canadian Western Fuel Company, Nanaimo; Nos. 1, 2, and 3 mines, Extension, and No. 5 mine, South Wellington, Wellington-Extension Colliery of the Canadian Collieries (Dunsmuir), Limited; Granby No. 1 Colliery of the Granby Consolidated Mining, Smelting, and Power Company, operating at Cassidy; Morden mine of the Pacific Coast Coal Mines, Limited; Lantzville mine of the Nanoose Wellington Collieries, operating at Nanoose; No. 1 slope of the East Wellington Coal Company; and the Adit level at the Old Wellington Colliery, Wellington.

Canadian Western Fuel Company.

Head Office—Nanaimo, B.C.

Capital, $1,500,000.

Officers.	*Address.*
C. P. Heaton, President,	San Francisco, Cal.
G. W. Bowen, Vice-Chairman,	Nanaimo, B.C.
Mark Bate, Jr., Secretary-Treasurer,	Nanaimo, B.C.
John Hunt, General Superintendent,	Nanaimo, B.C.
T. R. Jackson, Mine Manager, No. 1 Mine,	Nanaimo, B.C.
Robert Henderson, Mine Manager, Reserve Mine,	Nanaimo, B.C.
Arthur Newbury, Harewood Mine,	Nanaimo, B.C.
William Moore, Wakesiah Mine,	Nanaimo, B.C.

The above company has operated the following collieries at Nanaimo during the past year, namely: No. 1 or Esplanade shaft, Nanaimo; Protection Island mine, Harewood, and Reserve.

The following returns show the combined output of all the company's mines for the past year:—

AGGREGATE RETURNS FROM CANADIAN WESTERN FUEL COMPANY'S MINES FOR YEAR 1920.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	387,136			
" export to United States	136,912			
" " other countries	7,647			
Total sales		531,695		
Used in making coke				
" under colliery boilers, etc	129,433			
Total for colliery use		129,433		
		661,128		
Stocks on hand first of year	45,611			
" last of year	11,116			
Difference taken from stock during year		34,495		
Output of collieries for year		626,633		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	48		48		96	
Whites—Miners	410				410	
Miners' helpers						
Labourers	276		204		480	
Mechanics and skilled labour	119		140		259	
Boys	52		33		85	
Japanese						
Chinese			107		107	
Indians	3				3	
Totals	908		532		1,440	

RESERVE MINE.

Robert Henderson, Manager, vice David Brown, resigned November 30th, 1920; Frances John, Overman; Albert Manifold, James West, Henry A. Meikle, George Frater, Joseph Thompson, Henry Carroll, James McGrath, Benjamin Cheetham, Henry Allsopp, Ernest Kelly, Frederick Hilley, and James E. Knowles, Firebosses.

This mine is situated in the Cranberry district, about 5 miles south of Nanaimo. The coal is reached by two shafts at a depth of 955 feet. The seam worked in this mine is the Douglas and varies from 1 to 20 feet in thickness. The coal is a very good quality, but friable.

The ventilation of the mine is produced by a pair of 90-inch Sirocco fans, connected to a 20 by 30 engine, rope-driven. On the engine is a drive-wheel 17 feet in diameter and on the fan-shaft a drive-wheel 5 feet in diameter; these fans, running with an engine-speed of 16 revolutions a minute, are capable of producing 140,000 cubic feet of air a minute, against a 3-inch water-gauge. The fan and engine are erected on a concrete foundation 80 feet from the shaft.

The pillars on the East side of the mine are drawn back as far as No. 30 incline. No. 22 incline on the East side has advanced 600 feet during the year. The inside end of the West level is finished and nearly all the pillars extracted.

No. 1 heading on the West side has advanced about 700 feet during the year and is still being pushed ahead.

No. 1 heading on the West side and No. 22 incline on the East side are parallel to each other and are 2,500 feet apart, but the seam has been so irregular that the levels turned off have not advanced far until they struck faulty ground.

At the present time all coal is hoisted up No. 2 shaft, and it is proposed to drive a haulage-road from No. 1 West heading to connect with No. 22 incline, East side, so that the coal can be hoisted up No. 1 shaft.

Safety-lamps of the Wolf type are used in this mine, also a few Edison storage-battery electric safety-lamps, and all shots fired by electric battery.

On my last inspection of the mine in December I measured 50,000 cubic feet of air a minute passing into the mine, divided into three splits.

In No. 1 East split there was 14,500 cubic feet of air a minute passing for the use of fifty-five men and four horses.

In No. 2 East split there was 3,400 cubic feet of air a minute passing for the use of twelve men and one horse.

In the West side split there was 18,000 cubic feet of air a minute passing for the use of sixty men and four horses.

I found a small quantity of explosive gas in face of two stalls off No. 1 Right dip, No. 1 West heading.

Timbering and roadways were in good condition and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: No. 1 East split showing 0.3 per cent. methane in 16,000 cubic feet of air a minute; No. 2 East split showing 0.4 per cent. methane in 5,000 cubic feet of air a minute; West side split showing 0.4 per cent. methane in 20,000 cubic feet of air a minute; main return showing 0.7 per cent. methane in 54,000 cubic feet of air a minute.

The following are the official returns from the Reserve Colliery for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	80,483			
" export to United States	28,463			
" " other countries	1,590			
Total sales		110,536		
Used in making coke				
Used under colliery boilers, etc.	25,468			
Total for colliery use		25,468		
		136,004		
Stocks on hand first of year	435			
" last of year				
Difference taken from stock during year		435		
Output of colliery for year		135,569		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	12		10		22	
Whites—Miners	107	5.75-9.01			107	
Miners' helpers						
Labourers	54	5.75-6.29	49	5.82-6.27	103	
Mechanics and skilled labour	14	6.29-6.97	27	6.36-7.62	41	
Boys	18	3.52-5.75	7	2.58-4.83	25	
Japanese						
Chinese			21	3.13-4.33	21	
Indians	3	5.69-5.92			3	
Total	208		114		322	

WAKESIAH MINE.

William H. Moore, Manager; Thomas Jordan, Overman; Charles F. Webber, J. A. Challinor, Alfred Odgers, George W. Nash, George Grey, and Isaac Nash, Firebosses.

This mine is situated on the Canadian Western Fuel Company's farm, about 2 miles from Nanaimo, and is connected by a spur track with the Harewood branch line. Two shafts were sunk to a depth of 320 feet to the Wellington seam and a pair of levels driven about 1,400 feet in a south-westerly direction. Many faults have been encountered which have hindered development to some extent, but work is still being pushed forward. The seam varies from 3 to 14 feet in thickness. The output from this mine at the present time is from 250 to 300 tons daily.

Haulage is carried on by means of five winches driven by compressed air supplemented by horses. Water is taken care of by six pumps, two small and two large Camerons and two duplex pumps, all driven by compressed air, with the exception of the large Cameron at the shaft-bottom, which is steam-driven. The stables underground have been extended during the year.

The methods of working are by pillar and stall and long-wall. Some experiments have been made with the double-stall method of working, having for its object the better control of and the carrying of the frail roof, but this method had to be abandoned. At the present time, where practicable, long-wall seems to be giving the best results. The levels and slopes are driven 10 feet wide, with timbers on 3½-foot centres. Safety-lamps of the Wolf type, with the exception of a few Edison storage-battery lamps, are used underground.

During the year the Main levels were driven to the fault, cutting the coal-measures on the south-west, but slopes are still being driven to the south-east. A pair of headings are also being driven over towards the old Jingle Pot mine and are expected soon to be producing.

The mine is damp and free from coal-dust. Ventilation is produced by means of a single-inlet Murphy fan, which is now being driven direct, but can be changed to belt drive in a few minutes, an auxiliary engine being in readiness for that purpose.

The coal is still being hoisted from No. 2 shaft by a 14- by 16-inch first-motion engine supplied with steam by two 80-horse-power boilers at 120 lb. pressure, a $^{6}/_{10}$ 1⅛-inch hoisting-rope being used.

Another compressor, built on a reinforced concrete foundation, was installed during the year to cope with the increasing demand for power for development-work. Boilers have been suitably housed and steam-pipes covered. Pipe-lines and hydrants for fire-fighting purposes have been installed; also a new lamp-house. A new 23,500-gallon water-tank has been installed; also a feed-water heater.

Strenuous efforts are being made in the interests of safety, and as a consequence no serious accidents have as yet been reported, notwithstanding the poor roof overlying the greater part of the mine.

On my last inspection I measured 22,950 cubic feet of air a minute passing into the mine, divided into two splits.

In the East side split there was 9,000 cubic feet of air a minute passing for the use of twenty-eight men and two horses.

In the West side split there was 12,500 cubic feet of air a minute passing for the use of thirty men and six horses.

I found a small quantity of explosive gas in face of No. 2 stall off No. 1 East level, No. 1 dip. Timbering and roadways were in good condition and the mine free from coal-dust.

Tests with the Burrell gas-detector were as follows: East side split showing 0.2 per cent. methane in 10,000 cubic feet of air a minute; West side split showing 0.2 per cent. methane in 13,000 cubic feet of air a minute; main return showing 0.4 per cent. methane in 24,000 cubic feet of air a minute.

The following are the official returns from the Wakesiah Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	36,368			
" export to United States	12,862			
" " other countries	718			
Total sales		49,948		
Used in making coke				
Used under colliery boilers, etc.	13,395			
Total for colliery use		13,495		
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } stock during year				
Output of colliery for year		63,343		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	6		5		11	
Whites—Miners	53	5.75-9.01			53	
Miners' helpers						
Labourers	24	5.75-6.29	28	5.82-6.27	52	
Mechanics and skilled labour	14	6.29-6.97	10	6.36-7.62	24	
Boys	8	3.52-5.75	4	2.58-4.83	12	
Japanese						
Chinese			11	3.13-4.33	11	
Indians						
Totals	105		58		163	

HAREWOOD MINE.

Arthur Newbury, Manager; John White, Overman; John Kirkwood, James Handlen, James Richards, Isaac Hill, George S. Brown, William Bradley, and George Moore, Firebosses.

In this mine the most important development-work during the year was in the main South-east level, which has been driven a distance of 2,000 feet, and a new slope has been driven down a distance of 400 feet from the Main level; also a South-west heading has been driven a distance of 900 feet. This heading is being driven out to the surface for ventilation purposes and has about 200 feet more to go.

This has been the second largest producing mine of the Canadian Western Fuel Company's Nanaimo Colliery during the year, most of the output at present being from pillar-extraction.

(For description of power-house equipment and plant at the Harewood mine, *see* Minister of Mines' Report for 1919.)

Safety-lamps of the Wolf type are used exclusively in this mine and all shots fired by electric battery.

On my last inspection of this mine in December I measured 30,000 cubic feet of air a minute passing into the mine, divided into three splits.

In No. 1 split there was 14,000 cubic feet of air a minute passing for the use of fifty-five men and seven horses.

In No. 2 split there was 10,650 cubic feet of air a minute passing for the use of twenty men and six horses.

In No. 3 split there was 4,000 cubic feet of air a minute passing for the use of nine men and one horse.

No explosive gas found in this mine. Timbering and roadways were in fair condition and the mine free from coal-dust.

The Burrell gas-detector did not show any methane present in the mine-air.

The following are the official returns from the Harewood Colliery for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	93,708			
" export to United States	33,140			
" " other countries	1,851			
Total sales		128,699		
Used in making coke				
Used under colliery boilers, etc.	42,492			
Total for colliery use		42,492		
		171,191		
Stocks on hand first of year	21,080			
" last of year	7,170			
Difference taken from stock during year		13,910		
Output of colliery for year		157,281		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	8		14		22	
Whites—Miners	91	5.75 - 9.01			91	
Miners' helpers						
Labourers	38	5.75 - 6.29	55	5.82 - 6.27	93	
Mechanics & skilled labour	17	6.29 - 6.97	42	6.36 - 7.62	59	
Boys	6	3.52 - 5.75	11	2.58 - 4.83	17	
Japanese						
Chinese			21	3.13 - 4.33	21	
Indians						
Totals	160		143		303	

Pacific Coast Coal Mines, Limited.

Head Office—Victoria, B.C.

Capital, $3,000,000.

Officers.	*Address.*
James Carruthers, President,	Montreal, Que.
John H. Paine, Vice-President and Managing Director,	Victoria, B.C.
D. D. Muir, Secretary-Treasurer,	Victoria, B.C.
George Wilkinson, General Superintendent,	Victoria, B.C.

The following returns show the combined output of the company's mines for the year 1920:—

AGGREGATE RETURNS FROM MINES OF PACIFIC COAST COAL MINES, LIMITED, FOR 1920.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	61,031			
" export to United States	14,278			
" " other countries				
Total sales		75,309		
Lost in washing	13,479			
Used under colliery boilers, etc	16,145			
Total for colliery use		29,624		
		104,933		
Coal reclaimed 10,908 / Stocks on hand first of year 320	11,228			
" last of year	1,199			
Difference taken from stock during year		10,029		
Output of colliery for year		94,904		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	10		6		16	
Whites—Miners	88				88	
Miners' helpers	19				19	
Labourers	70		10		80	
Mechanics and skilled labour			32		32	
Boys	12		4		16	
Japanese						
Chinese			35		35	
Indians						
Totals	199		87		286	

MORDEN MINE.

William Roper, Manager; Daniel McMillan, Overman; Fred. Bell, John Devlin, Neil McIntyre, Neil McMillan, Richard Rallison, Peter Carr, George Oswald, and Andrew Dean, Firebosses.

This mine is operated on the Douglas seam and is situated in the Cranberry district, and about 2 miles from South Wellington.

(For description of power-house equipment and plant *see* Minister of Mines' Report for 1919.)

The mine is entered by two shafts sunk to a depth of 600 feet. The main shaft is 9 by 16 feet and the air-shaft 9 by 12 feet in the clear. The ventilation is produced by a Sheldon double-entry fan 7 feet in diameter, driven by a 16 by 12 Vulcan Iron Works engine.

During the year fourteen cottages were removed from South Wellington and rebuilt at Morden. These cottages contain four rooms and pantry. Two eight-roomed houses occupied by the manager and overman have also been rebuilt at Morden. One large boarding-house was removed from South Wellington and rebuilt at Morden. This boarding-house in conjunction with three cottages for sleeping-quarters gives accommodation for thirty-two boarders. The overman's office has been temporarily fitted up to accommodate the office and engineering staff until the office is moved from South Wellington. One large water-tank has been removed from South Wellington and rebuilt at Morden to improve the water-supply system to the boilers.

New Equipment installed.—In the machine-shop one oxy-acetylene welding outfit and one punch and shears outfit. At Boat harbour one gasolene pumping-engine has been installed for water-supply; underground, one 9- by 12-inch duplex haulage-engine has been installed.

Improvements on Surface at Mine.—A complete overhaul of boilers, steam-lines, electric units, and screening plant has been made.

Railway.—The tracks in the mine yard have been overhauled and raised to the proper grade and considerable work has been done on the railway. No. 2 locomotive has been completely overhauled and practically rebuilt. Considerable repair-work has also been made on No. 3 locomotive, including new wheels for tender.

Boat Harbour Plant.—The steam plant at Boat harbour has been given a complete overhaul. The Jeffery-Robinson washer has been practically rebuilt and considerable repairs have been made to the loading plant.

Underground Development.—The old slope which was discontinued some four years ago has been reopened and has been cleaned and retimbered and retracked for a distance of approximately 1,300 feet. This slope will now be driven into the south-eastern portion of the field.

A new airway has been made for a distance of some 500 feet, paralleling this slope at points where the old one is caved. Considerable work has been done on permanent stoppings to improve the ventilation.

The development of the mine has been pushed during the year as rapidly as labour conditions would permit, some 15,000 feet of solid work having been driven during the year.

During the coming year it is expected a vigorous policy of development will be continued. Plans have been prepared for the remodelling of the shaft-bottom. Delivery of loaded cars will be arranged from three different sources to one side of the shaft.

Grades will be made whereby the loaded cars will descend gently from a fixed point to the cage. The empty cars will be released from the cage on the opposite side and will fall away on a gentle grade to a fixed point, where they will be picked up and elevated by a car-haul to a height whereby they will run by gravity back to the point where the loads are delivered. This shaft-bottom will be worked automatically as nearly as it is possible to make it.

The main entries of the mine will be pushed ahead vigorously, there being some 1,800 acres of virgin territory yet to be developed in this mine; from the average tons to the acre already produced from the worked portion of the mine, it is estimated this territory will yield 1,000 tons a day for the next fifty years. Various improvements to the preparation and loading plants are contemplated during the coming year.

On my last inspection of this mine I measured 50,000 cubic feet of air a minute passing into the mine, divided into three splits.

In No. 1 split there was 3,800 cubic feet of air a minute passing for the use of fifteen men.

In No. 2 split there was 3,500 cubic feet of air a minute passing for the use of twelve men.

In No. 3 split there was 20,000 cubic feet of air a minute passing for the use of sixty-seven men and three horses.

No explosive gas found. Timbering was in good condition, with the exception of No. 1 North level, where there were some broken stringers which required replacing. This was ordered to be attended to immediately. Roadways were in fairly good order. The mine was fairly free from coal-dust, with the exception of parts of Nos. 1 and 2 North levels, which were somewhat dusty. The attention of the manager was directed to this matter.

Tests made with the Burrell gas-detector were as follows: No. 1 split showing two-tenths of 1 per cent. methane in 4,200 cubic feet of air a minute; No. 2 split showing two-tenths of 1 per cent. methane in 4,000 cubic feet of air a minute; No. 3 split showing three-tenths of 1 per cent. methane in 23,000 cubic feet of air a minute; main return showing four-tenths of 1 per cent. methane in 54,000 cubic feet of air a minute.

The following are the official returns from the Morden Colliery for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	61,031			
" export to United States	14,278			
" " other countries				
Total sales		75,309		
Lost in washing	13,479			
Used under colliery boilers, etc.	16,020			
Total for colliery use		29,499		
		104,808		
Coal reclaimed 10,908 / Stocks on hand first of year 320	11,228			
" last of year	1,199			
Difference taken from stock during year		10,029		
Output of colliery for year		94,779		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	10	6.67	5	6.00	15	6.00 - 6.57
Whites—Miners	86	7.02			86	7.02
Miners' helpers	18	5.55			18	5.55
Labourers	70	4.78 - 6.25	9	3.25 - 5.51	79	3.25 - 6.25
Mechanics and skilled labour			31	5.10 - 7.23	31	5.10 - 7.23
Boys	12	4.15 - 4.53	4	3.30	16	3.30 - 4.53
Japanese						
Chinese			35	3.32	35	3.32
Indians						
Totals	196		84		280	

Name of seams or pits—Working on the upper Douglas seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—At the Morden mine coal is reached by means of shafts. No. 3 shaft, 655 feet in depth, 10 by 18 feet in the clear; No. 3 air-shaft, 630 feet in depth, 10 by 10 feet in the clear; upcast air-shaft is also equipped with steam-hoist and cage as the emergency outlet. All machinery for handling coal electrically driven.

Description and length of tramway, plant, etc.—At Morden mine the plant consists of three 150-horse-power and two 100-horse-power return-tubular boilers; one pair 24 by 36 hoisting-engines with safety overwinding device, with steam-reverse and steam-brake; two 10-foot sheaves and two self-dumping cages; one Canadian Rand cross-compound air-compressor; two 150-kw. electrical generators connected with 13 by 20 by 9 high-speed engines; one Sheldon ventilating mine-fan, direct-connected to a 17 by 20 engine, also motor-driven as auxiliary. There is a thoroughly equipped machine-shop and also mine-rescue station containing two sets Gibbs rescue apparatus complete, capacity four to eight hours. A standard-gauge railway 7½ miles long connects the mines with Boat harbour, the shipping-point, equipped with wharves and bunkers which will accommodate the largest ocean-going steamers.

The Nanoose Collieries Co., Ltd.

Head Office—Vancouver, B.C.

Officers.	*Address.*
F. H. Lantz, Managing Director,	
John A. Coleman, Secretary-Treasurer,	Vancouver, B.C.
W. W. Norman, Accountant,	
James W. Jemson, Superintendent,	Wellington, B.C.

Value of plant, $200,000.

LANTZVILLE MINE.

This mine is situated at Nanoose Bay, about 9½ miles north of Nanaimo, and is worked in what is known as the Old Wellington seam.

A shaft 8 by 16 was sunk on the property a distance of 133 feet, with levels turned off east and west. The coal varies from 3 to 4 feet in thickness, lying in two benches, with rock varying from 2 to 5 feet thick between the coal. The coal is hoisted from the shaft and the slope is used as a travelling-way for the workmen and for ventilation.

The seam generally is in two parts, with a shale from 2 to 4 feet in thickness. The coal is hard and of good quality and finds a ready market. The seam up to the present time has been subject to considerable disturbance and is very irregular. All the workings so far have been on the pillar-and-stall system.

The plant now consists of three boilers with a total horse-power of 360, two compressors delivering 950 cubic feet of free air a minute, and a first-motion hoisting-engine of 75 horse-power.

Electrical power is generated by a 150-kw. generator, this power being used extensively in the screening and washing plant. The storage-bunkers have a capacity of 1,000 tons, the coal being conveyed from the bunker to the shipping-point by means of cars.

Several important alterations have been made to facilitate the haulage. A new level has been made on the East side, which shortens the haul and makes a satisfactory grade. The Main level is being relaid with 30-lb. steel rails and some sharp curves taken off with a view to installing electric locomotives. Two slopes have been opened which are looking well. No. 2 slope struck a down-throw fault, where the seam dropped about 30 feet; work is being pushed ahead and a good field of coal is anticipated.

So far the ventilating-current has been conducted on one continuous current, but an overcast is being built which will divide the air-current, and allow a larger number of men to be employed on a shift. This will enable the management to increase the output with an eight-hour hoisting-day, which will cheapen the operating expenses considerably.

On the surface extensive improvements are in hand, principally in the preparation and avoiding breakage of lump coal. A new tipple has been installed and a retarding device to prevent coal-breakage in the bunkers.

A conveyor-belt is being installed at the wharf, which will be a great improvement to the loading facilities, both in speed of loading and avoiding serious breakage of coal.

In the spring it is proposed to build a breakwater from the end of the wharf, and thus enable the loading to go on in smooth water, and will also afford safe harbourage for scows in all weather. It will readily be seen that the completion of the above will expedite the rapid loading of scows, estimated to be 600 tons in eight hours. The coal is taken from the bunkers and boom-loaded into 2-ton cars hauled by an endless-rope system to the wharf.

At present the large majority of the workmen are transported by "jitney" from Nanaimo, etc., but twenty-six houses are under course of construction and will be ready for occupation in the near future, whereby about half of the workmen will be living on the spot. The houses are up to date in every respect, each containing a bathroom, and are fully equipped with modern plumbing fixtures, and each house is plastered throughout. The village is situated a short distance from the mine, on the hillside overlooking the bay, and as opportunity offers more houses will be constructed.

A neat and well-equipped first-aid station has been erected, where the mine-rescue apparatus is also stored. First-aid classes are being organized for the workmen, and as the superintendent has always taken a keen interest in first-aid work the Nanoose Wellington Collieries will probably be a close competitor in the first-aid events at the Island competitions.

This company is also equipping the mine with the Edison electric storage-battery safety-lamp, which is a policy to be highly commended. Several new pieces of machinery have been installed in the machine-shop, and the blacksmith-shop is being enlarged to admit two forges. One Radialaxe coal-cutter has been installed, and it is hoped that there will be more required in the near future.

Diamond-drill operations will be commenced on the company's property to prove the coalfield.

On my last inspection of this mine I measured 22,000 cubic feet of air a minute passing into the mine for the use of sixty-five men and eight horses. In all of my inspections of this mine during the year I found the mine free from explosive gas. Timbering and roadways were in good condition and the mine free from coal-dust.

In making tests with the Burrell gas-detector on one occasion I found 0.1 per cent. methane in the mine-air.

The following are the official returns from the Lantzville Colliery for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	17,923			
" export to United States	9,480			
" " other countries				
Total sales		27,403		
Used in making coke				
Used under colliery boilers, etc.	4,200			
Total for colliery use		4,200		
Stocks on hand first of year	113			
" last of year	1,010			
Difference added to stock during year		897		
Output of colliery for year		32,500		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.*

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	1	8.00	5	7.50	6	7.60
Whites—Miners	102	7.25	.....	.....	102	7.25
Miners' helpers	40	6.10	.....	.....	40	6.10
Labourers	18	6.00	28	4.75	46	5.25
Mechanics and skilled labour	2	5.73	29	6.10	31	6.05
Boys	.....	.....	.....	.....	.....	.....
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	.....	15	4.50	15	4.50
Indians	.....	.....	.....	.....	.....	.....
Totals	163	.....	77	.....	240	.....

* These figures are from November statistics.

Granby Consolidated Mining, Smelting, and Power Co. Colliery at Cassidy.

Officers.	*Address.*
W. L. Nichols, President,	52 Broadway, New York.
J. T. Crabbs, Vice-President,	52 Broadway, New York.
Edward Everett, Secretary,	52 Wall Street, New York.
G. W. Wooster, Treasurer,	813 Birks Bldg., Vancouver.
H. S. Munroe, General Manager,	
R. R. Wilson, Superintendent,	Cassidy, B.C.

GRANBY No. 1 COLLIERY.

R. R. Wilson, Manager; James Touhey, Overman; Jonathan Henney, Shiftboss; John Bennett, Thomas Bullen, Ernest H. Devlin, John Wright, Joseph Lavin, Henry Mitchell, Alexander McLachlan, Robert Houston, and John Newman, Firebosses.

This mine is situated at Cassidy, and is opened up in the Douglas seam, which averages 10 feet in thickness. It was acquired mainly to secure a supply of coke for the company's smelter at Anyox.

The area set apart at this colliery for a residence district comprises about 80 acres of bench land overlooking the Nanaimo river to the north and Haslam creek to the south, and sheltered by forested ridge to east and west, which is being preserved as a park.

(For description of townsite, rooming-house, mess-house, change-house, mine buildings, tipple and washery, and power-house equipment see Minister of Mines' Report for 1919.)

SURFACE.

The chief improvements in connection with the surface operations are as follows:—

Additional equipment has been installed in the machine-shop, consisting of radial drill, power-shears, power-punch, Universal machine, and Universal tool-grinder. The shop is now one of the best-equipped coal-mine shops in the Province.

The washery has been equipped with seven Deister-Overstrom coal-washing tables for washing the fine slack, and a Dorr thickener 75 feet in diameter is being installed, so that coal can be thoroughly prepared for shipment to market.

Arrangements have been made for the installation of an additional 360-horse-power B. & W. water-tube boiler equipped with Riley mechanical stokers and flume for handling ashes.

A large timber-yard has been installed close beside the railroad-track, so that mine-timber can be dumped from railroad-cars to skids and thence loaded on timber trams or trucks connecting with the mine.

A cooling-pond equipped with thirty-two spray-nozzles has been installed in connection with the power-house condensers.

Granby No. 1 Colliery has now passed from the development to the production stage, and has one of the largest daily productions of any single mine in the Province.

UNDERGROUND.

Development-work has been pushed rapidly ahead during the year. The Main slope and manway are driven approximately 3,600 feet from the surface. Five pairs of levels have been turned to north and south. No. 2 North level was extended to a point about 1,420 feet from the manway. No. 3 North level was not developed during the year. No. 4 North level and counter-level were driven approximately 1,100 feet during the year. No. 5 North level has been turned from the manway and also from a pair of slopes off No. 4 North level. No. 5 South level has been started from the Main slope. No. 4 South level has been driven about 1,300 feet from the Main slope and No. 3 South level extended to a point about 1,500 feet south of the Main slope.

CHARACTER OF SEAM.

The seam continues irregular in thickness, subject to rolls in the roof and floor. A number of silted areas have also been encountered. The coal is a very good quality, but friable.

The colliery produced approximately 200,000 tons during the year, the daily production having been increased to 1,200 tons a day at the close of the year. Preparations are being made to double-track the Main slope in order to get the benefit of balanced hoisting and to speed up the haulage system. This should enable the output to be increased to 1,500 tons when required. The main partings have also been lengthened to efficiently handle the increased production and are being whitewashed and equipped with electric lights.

A thoroughly modern and up-to-date spray or sprinkling system has been installed on the Main slope in order to lay the coal-dust and eliminate as far as possible this danger.

LIGHTING.

Edison storage-battery electric lamps have been used exclusively in the mine during the year. Only firebosses, shotlighters, and bratticemen use the Wolf-type safety-lamp for testing purposes.

VENTILATION.

The new Sirocco fan, capacity 150,000 cubic feet of air a minute, housed in a concrete fire-proof structure, has been in continuous operation and has given satisfactory results. The mine is very well ventilated, and in a short time connections will be made between Nos. 3 and 4 levels on both North and South sides, giving a separate intake and return airway for each side of the mine and separated by large and substantial pillars.

DRAINAGE.

The drainage-level has been completed to the Nanaimo river and now handles all water entering the mine from the quicksand and gravel, relieving two pumps for use in the lower workings. The water from lower levels drains to central sump and is pumped to the drainage-level, along which it flows by gravity.

THE MINE.

The Main slope, which has been driven wide enough for a double track, is exceptionally well timbered with peeled round fir timber from 14 to 16 inches in diameter. The sets are carefully framed on the surface and collar-braced when placed in position.

The mine is being handled with the idea of extracting the largest possible percentage of coal from the area at a minimum cost rather than to produce coal for a few months to the final detriment of the mine. No pillar coal is being extracted.

A complete telephone system has been installed connecting the various offices, shops, and officials' residences with the underground workings.

The landing at the top of the Main slope has been covered in to keep the rope-riders and knucklemen dry and eliminate danger of accident on account of slippery and muddy roadway.

On my last inspection in December I measured 103,500 cubic feet of air a minute passing into the mine, divided into four splits.

In No. 1 South split there was 19,440 cubic feet of air a minute passing for the use of thirty men, or an average of 648 cubic feet of air a minute for each unit employed.

In No. 2 South split there was 24,000 cubic feet of air a minute passing for the use of thirty men, or an average of 800 cubic feet of air a minute for each unit employed.

In No. 1 North split there was 8,000 cubic feet of air a minute passing around the old workings of this section.

In No. 2 North split there was 24,850 cubic feet of air a minute passing for the use of fifty-five men, or an average of 451 cubic feet of air a minute for each unit employed.

I found a small quantity of explosive gas in face of Nos. 5 and 7 stalls off No. 4 North slope. Timbering and roadways were in good condition and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: No. 1 South split showing 0.2 per cent. methane in 22,400 cubic feet of air a minute; No. 2 South split showing 0.2 per cent. methane in 25,300 cubic feet of air a minute; No. 2 North split showing 0.3 per cent. methane in 26,000 cubic feet of air a minute; main return showing 0.4 per cent. methane in 130,000 cubic feet of air a minute.

The following are the official returns for the Granby Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	144,656			
" export to United States	8,121			
" " other countries				
Total sales		152,777		
Used in making coke				
Lost in washing	44,989			
Used under colliery boilers, etc.	11,511			
Total for colliery use		56,500		
		209,277		
Stocks on hand first of year	12,966			
" last of year	5,278			
Difference taken from stock during year		7,688		
Output of colliery for year		201,589		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	4	7.37	10	8.25	14	7.94
Whites—Miners	125	8.61	.....	.....	125	8.61
Miners' helpers	.....	.....	.....	.....	.....	.....
Labourers	68	5.82	51	5.24	119	5.57
Mechanics and skilled labour	7	6.24	25	6.44	32	6.39
Boys	.....	.....	10	3.25	10	3.25
Japanese	.....	.....	.....	.....	.....	.....
Chinese	.....	.....	.....	.....	.....	.....
Indians	.....	.....	.....	.....	.....	.....
Totals	204	7.57	96	5.66	300	6.95

Name of seams or pits—Granby Colliery No. 1, Douglas seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—Douglas seam. Average dip, 20°. Seam irregular in thickness, varying from 0 to 25 feet sometimes in remarkably short distances. Seam subject to rolls, pinched and silted areas. The mine is being operated with the idea of extracting largest possible percentage of coal at minimum cost. Large and substantial pillars have been left along all main haulage-roads and permanent airways. The Main slope has been driven approximately 3,600 feet from the surface, is exceptionally well timbered, and has been driven wide enough for two tracks. Five levels have been turned to north and south off the Main slope. Practically all coal extracted to date has come from development places.

Description and length of tramway, plant, etc.—Plant modern in every way. Sirocco fan capacity 150,000 cubic feet a minute; Vulcan hoist, 18 by 36 inches, double-drum second-motion; tipple equipped with Rotary dump, Marcus screen, loading-booms, railway-cars handled with Fairmont car-retarders; washery equipped with 2-compartment jigs, capacity 80 tons an hour, sludge-recovery, and seven Deister-Overstrom tables. Bone coal burned under the boilers. Edison storage-battery electric lamps used underground. No horses or mules used. Storage-battery locomotives used for underground haulage. Boiler plant equipped with Badenhausen boilers fired by type E mechanical stokers; ashes flumed to dump.

Canadian Collieries (Dunsmuir), Ltd.

Head Office—Montreal, Que.

Capital, $15,000,000.

Officers.	*Address.*
F. Perry, President,	Montreal, Que.
H. B. Walker, Vice-President,	Montreal, Que.
H. S. Adlington, Secretary-Treasurer,	Montreal, Que.
J. M. Savage, General Manager,	Victoria, B.C.
Thos. Graham, General Superintendent,	Cumberland, B.C.

The Canadian Collieries (Dunsmuir), Limited, in 1910 acquired all the holdings of the Wellington Colliery Company, Limited, and since then has been operating the following mines:—

The Extension Colliery, in the Cranberry District (Extension); T. A. Spruston, manager.

The Comox Colliery, in the Comox District; Charles Graham, district superintendent; William Walker, John L. Williams, J. G. Quinn, managers at the several mines.

The following table shows the combined output of all this company's collieries during the past year:—

Aggregate Returns from the Canadian Collieries (D.), Ltd., Mines for Year 1920.

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	431,588			
" export to United States	139,994			
" " other countries				
Total sales		571,582		
Lost in washing	147,644			
Used in making coke				
Sold to employees	8,738			
" under colliery boilers, etc	22,017			
Total for colliery use		178,399		
		749,981		
Stocks on hand first of year	13,783			
" last of year	6,430			
Difference taken from stock during year		7,353		
Output of collieries for year		742,628		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	89		50		139	
Whites—Miners	572				572	
Miners' helpers	9				9	
Labourers	226		172		398	
Mechanics and skilled labour	63		187		250	
Boys	13		41		54	
Japanese	78		1		79	
Chinese	357		260		617	
Indians						
Totals	1,407		711		2,118	

WELLINGTON-EXTENSION COLLIERY.

Thomas A. Spruston, Superintendent; James Strang, Manager, Nos. 1, 2, and 3 Mines.

The general supervision of this colliery is entrusted to Mr. Spruston, who has an overman in charge of each mine. These mines were formerly operated by the Wellington Colliery Company, but, like the Comox mines, were taken over by the Canadian Collieries (Dunsmuir), Limited, in 1910.

The Wellington-Extension Colliery is composed of Nos. 1, 2, and 3 mines at Extension, and No. 5 mine at South Wellington, all situated in the Cranberry district.

A railway 11 miles in extent connects the Extension mines with Ladysmith, the shipping-point for the output from these mines. The output from No. 5 mine, South Wellington, is taken over the Esquimalt & Nanaimo Railway to Ladysmith and Mainland points.

All these mines have practically worked full time during the year.

Nos. 1, 2, and 3 mines at Extension are connected by a tunnel driven 14 by 7 in the clear, on a 1-per-cent. grade, and a little over a mile in length. Double tracks reach as far as the No. 1 mine junction, with crossover switches at variable distances along the tunnel. Electric lights are strung along the tunnel in close proximity to these switches. Electric-motor haulage is maintained along the tunnel and continued into the Nos. 2 and 3 mines, the underground employees being taken to and from their work in each respective mine along this tunnel by means of a "riding-trip" of cars hauled by a 13-ton Baldwin-Westinghouse electric locomotive.

Power-house.

The boiler plant consists of four Goldie & McCulloch return-tubular boilers of 163-horse-power capacity each. The ashes are removed by washing and fluming to a pit and loaded on a rail-dump car by means of a bucket elevator.

Electric power is supplied by three 250-volt D.C. generators. No. 1 is a Cracken-Wheeler generator of 112.5-kw. capacity, direct-coupled to a 15 by 14 Ideal engine; No. 2 is a Westing-house 150-kw. capacity, connected direct to a Fleming-Harrisburg compound engine, size 14 by 14 by 32; and No. 3 is a General Electric 150-kw. capacity, direct-connected to a 16 by 16 Robb-Armstrong engine. A Blake fire and supply pump, 12 by 8 by 10, is maintained in good order in the boiler-house.

Tipple.

The mine-cars are handled over a Phillips crossover dump which are cut off the trip and fed to the dump by means of a steam-ram. Perforated shaker screens feed the coal to a 50-foot picking-table. An elevated rock-dump is used in conjunction with the tipple, with a self-dumping skip operated by an electric hoist with a 1-inch wire cable.

The usual repair-shops for underground service are in close proximity to the tipple, consisting of machine, blacksmith, car-repair, and electric shops, with standard mine-gauge track running into each of them, and railway-car repair and carpenter shop. This latter shop is equipped with rip-saw, band-saw, circular saw, boring-machine, and lathes.

The Wash-house.

This combined change and wash house for the use of the employees is 120 by 30 feet and consists of four separated changing-compartments capable of providing ninety lockers to each compartment. The bath-room is situated in the centre of the building, giving easy access to the four compartments, and consists of twenty-seven spray-baths and eight hot- and cold-water taps over a 3-foot bench containing wash-basins. The whole installation is good from a sanitary standpoint. A dry-room is provided for extra-wet clothes; here the men may turn their wet garments over to the attendant and have them thoroughly dried for the next day.

A landing-platform, 120 by 40, is laid along the front of the wash-house where the workmen's train arrives, thus giving ample room to the men in getting off the train.

First-aid and Mine-rescue Training-station.

A fully equipped building is kept and maintained in good condition at Extension, with work-room, observation-room, smoke-room, and dressing-room fitted with lockers and bath. The equipment consists of four 2-hour sets of the Paul apparatus, one oxygen-pump, four oxygen-tanks, one pulmotor, and electric safety-lamps of the Draeger and Edison type. During the year thirty-seven men have passed an examination in first-aid training and a number of them have taken training in mine-rescue work.

Ladysmith.

The shipping-point for the output of this colliery is at Ladysmith, where the coal is either shipped by vessel or railway-cars by means of transfer-barge to Mainland points. The coal-washery is also situated at this point, and consists of three "washers" of the following dimensions: Nos. 1 and 2, diameter 8 feet 9 inches, depth 5 feet 6 inches; No. 3, diameter 8 feet 3 inches, depth 5 feet 9 inches; computed capacity of each washer, 300 tons for twelve hours. Six compartment jigs are situated on the lower floor. Two Masco tables, 14 by 7 feet, take care of the fine coal, which produces a high-grade coal for coking purposes and foundry use.

Power for the washery is supplied by a Pelton wheel which is operated from the mountain water source. A 40-k.w. 240-volt Allis-Chalmers-Bullock generator supplies power to operate the Masco tables, which are driven by a 25-horse-power General Electric type H motor, and also supplies light for all purposes on the shipping-wharf, transfer-wharf, and around the plant.

No. 1 or Tunnel Mine, Extension.

James Strang, Manager, Nos. 1, 2, and 3 Mines; William Wilson, Overman; James Glen, John Greenhorn, Walter Joyce, Thos. Wilson, William Clifford, and David, J. Gordon, Firebosses.

This mine is operated on the Wellington seam and has been in continuous operation throughout the year. The method of mining is the long-wall system; owing to the broken and dislocated condition of the field, hand-mining is employed.

The development during the year has been concentrated on the No. 3 slope, which is driven off the Main slope at a point 3,000 feet from the top. This slope is down a distance of 1,600 feet, with counter-slopes paralleling on each side, with 100-foot pillars between them.

Nos. 1, 2, 3, 4, and 5 levels have been turned off on the East side of this slope and are operating at present in coal averaging about 3 feet thick, somewhat troubled with a series of "rolls" and "steps" in the seam, and overlaid with a thick burden of carbonaceous shale. On the West side Nos. 4, 5, and 6 levels are being operated, the seam varying from 2 to 10 feet in thickness.

The haulage equipment consists of a 100-horse-power Ottumwa electric hoist situated at the top of the Main slope. The lower development of the No. 3 slope haulage is maintained by a 50-horse-power Ottumwa hoist driven by a Westinghouse motor.

The Edison storage-battery electric safety-lamps are in use throughout the mine. Only the firebosses use safety-lamps of the Wolf type for testing purposes. All blasting is done with permitted explosives fired by electric battery.

This mine is ventilated by a Murphy-type exhaust-fan with a capacity of 40,000 cubic feet of air a minute, against a 1.9-inch water-gauge, driven by an Allis-Chalmers-Bullock motor.

On my last inspection of this mine I measured 24,600 cubic feet of air a minute passing for the use of forty-five men and five mules.

I found a small quantity of explosive gas in face of No. 6 West level off No. 3 slope. Timbering and roadways were in good condition and the mine free from coal-dust. Test made with the Burrell gas-detector in the return airway showed three-tenths of 1 per cent. methane in 30,000 cubic feet of air a minute.

No. 2 Mine, Extension.

Robert L. Spruston, Overman; Joseph Mason, Joseph Watson, William Cosier, John Davidson, Robert N. Hamilton, Owen Dabb, Edward Heyes, and William Simpson, Firebosses.

This mine has been in continuous operation during the year, and, like No. 1 mine, is operating on the Wellington seam. The method of mining is part long-wall and part pillar and stall, as the conditions and thickness of seam permit.

This mine is divided into two districts—namely, No. 4 East district and the West Incline district. No. 4 East district turns off the Main tunnel at a distance of 1 mile from the entrance to the mine and is in a distance of 1¼ miles.

At present all the operations are being concentrated on the upper or rise side of the level, which is being operated by means of four inclines—namely, East incline, Nos. 1, 2, and 17. The East incline and Nos. 1 and 2 are worked on the pillar-and-stall method, while No. 17 incline is worked on the long-wall system, the seam being very thin and undulating. Nos. 1 and 17 Incline sections are operated by mule and gravity-haulage, while No. 2 Incline section is operated by mules, with an electric hoist conveying the output down the incline. The coal is gathered from all these inclines by a Baldwin-Westinghouse locomotive.

West Incline District.

This incline is up a distance of 1,800 feet and was driven for the purpose of recovering a large number of pillars and a small area of thin coal that had been abandoned previously.

Opening-up work has been continued by means of levels driven from the incline, where some good coal of excellent quality has been recovered. Owing to the heavy cost of maintaining the

timber supporting a very bad roof for a double-track self-acting incline, the section has been idle during the last few weeks, pending the installation of a hoist and alterations to the haulage.

This mine, like No. 1, is equipped with the Edison storage-battery electric safety-lamps, safety-lamps of the Wolf type being used only by the firebosses for testing purposes. All blasting is done with permitted explosives fired by electric battery.

The pumping equipment of this mine consists of a 5-stage Mather & Platt turbine-pump, 375-gallons-a-minute capacity at 250-foot head, running 1,400 r.p.m., driven by a 75-horse-power D.S.C. General Electric motor, and a 3-stage Mather & Platt pump, 275-gallons-a-minute capacity at 225-foot head, running 1,400 r.p.m.

The mine is ventilated by a Murphy fan of 40,000-cubic-feet capacity, against a 1.9-inch water-gauge, and is driven by a 25-horse-power type D.L.C. General Electric motor.

On my last inspection I measured 27,850 cubic feet of air a minute passing into the mine, divided into two splits.

In No. 4 East split there was 15,850 cubic feet of air a minute passing for the use of fifty men and nine mules.

In the West Incline split there was 10,000 cubic feet of air a minute passing for the use of twenty men and two mules.

I found no explosive gas in this mine. Timbering and roadways were in good condition and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: No. 4 East split showing two-tenths of 1 per cent. methane in 17,500 cubic feet of air a minute; West Incline split showing two-tenths of 1 per cent. methane in 11,400 cubic feet of air a minute; Main return showing three-tenths of 1 per cent. methane in 35,000 cubic feet of air a minute.

No. 3 Mine, Extension.

Thomas Strang, Overman; James P. Nimmo, Jr., David Davidson, George Smith, Daniel Campbell, and Patrick Malone, Firebosses.

Operations have been carried out successfully during the year, which consist of pillar-and stall work and pillar-extraction. Development-work has been concentrated principally on the No. 4 West district, which is being driven with the object of recovering an area of solid coal between McCoy's Incline fault-line and the old Vancouver Company's slope; and with a view to recovering a large area of pillars to the rise side of the level.

The Main heading and McCoy's incline are engaged solely on pillar-extraction. The haulage equipment consists of a 50-horse-power Ottumwa electric hoist driven by a 50-horse-power General Electric motor. The Main level haulage is operated by a Baldwin-Westinghouse locomotive. The water in this mine is taken care of by a single-stage Gould centrifugal pump, 100-feet-a-minute capacity, driven by a 25-horse-power Allis-Chalmers-Bullock motor.

This mine is ventilated by a Guibal exhaust-fan with a capacity of 60,000 cubic feet of air a minute, against a 1.7-inch water-gauge.

This mine is also equipped with the Edison storage-battery electric safety-lamp, with Wolf-type safety lamps for the firebosses. All blasting is done with permitted explosives fired by electric battery.

On my last inspection of this mine I measured 22,000 cubic feet of air a minute passing into the mine, divided into two splits.

In No. 1 split there was 12,000 cubic feet of air a minute passing for the use of thirty men and six mules.

In No. 2 split there was 9,500 cubic feet of air a minute passing for the use of twenty-five men and five mules.

I found a small quantity of explosive gas in face of Souli's pillar, McCoy's incline. Timbering and roadways were in good order and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: No. 1 split showing three-tenths of 1 per cent. methane in 14,000 cubic feet of air a minute; No. 2 split showing two-tenths of 1 per cent. methane in 11,000 cubic feet of air a minute; main return showing four-tenths of 1 per cent. methane in 32,000 cubic feet of air a minute.

The following are the official returns from the Extension Collieries for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	92,611			
" export to United States	46,717			
Total sales		139,328		
Sales to employees	3,310			
Used under colliery boilers, etc	12,247			
Lost in washing	42,488			
Total for colliery use		58,045		
		197,373		
Stocks on hand first of year	2,426			
" last of year	1,458			
Difference taken from stock during year		968		
Output of collieries for year		196,405		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	24		14		38	
Whites—Miners	237				237	
Miners' helpers	9				9	
Labourers	90		57		147	
Mechanics and skilled labour	14		32		46	
Boys			19		19	
Japanese						
Chinese	6		49		55	
Indians						
Totals	380		171		551	

Name of seams or pits—Wellington, Extension.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 1, 2, and 3 mines connected by main tunnel.

No. 5 MINE, SOUTH WELLINGTON.

Thomas A. Spruston, Manager; David Martin, Overman; Joseph Lane, James E. Parrott, James McLachlan, Adam Watson, Thomas Robson, Robert Ewing, and William Brown, Firebosses.

This mine is situated at South Wellington, about 5 miles south of Nanaimo, alongside of the Esquimalt & Nanaimo Railway. It is operating in the Douglas seam, adjacent to the Old Alexandria mine.

The slope is down a distance of over 3,000 feet, being driven 14 by 8 in the clear, and well timbered. Operations on the development of this slope have been greatly retarded owing to the broken nature and barren ground in this field. Levels have been turned off to the north and south of the Main slope, where further slopes have been developed, the mine being worked on the pillar-and-stall method.

A diagonal slope was turned away during the year off No. 3 North level at a point 500 feet from the Main slope, and is down a distance of 1,500 feet, and, like the Main slope, has had barren and broken ground to contend with; levels are being driven to the north and south in coal varying from 2 to 10 feet thick.

On the No. 3 South level a diagonal slope has been driven a distance of 1,400 feet, having a showing of 6 feet of good hard coal, which is well adapted for steaming purposes; levels are being extended north and south off this slope.

The haulage equipment consists of a steam-driven hoist, 18 by 36, situated on the surface to operate the Main slope. A 100-horse-power Ottumwa electric hoist is driven by a M.S.D. General Electric motor hauls the output from the North diagonal slope. The South diagonal slope is operated by a 50-horse-power compressed-air-driven hoist.

The ventilation is produced by an 8-foot Stine fan, belt-driven by a 50-horse-power type 3 Westinghouse motor, with a capacity of 80,000 cubic feet of air a minute, against a 1.5-inch water-gauge.

This mine is equipped with the Edison storage-battery electric safety-lamp, the Wolf-type safety-lamp being used only by the firebosses for testing purposes. All blasting is done with permitted explosives fired by electric battery.

Power-house.—Power is supplied by three Goldie & Bullock return-tubular boilers of 163-horse-power capacity each. Fuel is supplied from the fine screenings conveyed by a scraper conveyor direct from the shaker screens to the boiler-house. One 250-volt D.C. Cracken-wheel generator of 112-kw. capacity, direct-coupled to a 15 by 14 Ideal engine; one Sullivan air-compressor, W.B. 2 size, 22 by 24 by 14½; one Ottumwa 100-horse-power steam-driven hoist and supply pump.

The tipple consists of a revolving dump, chain car-haul, shaker screens carrying two decks for the separate grades of coal, with suitable arrangements made for taking any boiler fuel automatically when required.

Buildings.—There are the usual mine buildings laid out with a view to facilitating and concentrating the work as near the mine as possible. Lamp-house with a first-aid room adjoining. This mine is equipped with two 2-hour sets of the Paul apparatus for mine-rescue work; the offices, with the mine supply stores attached, blacksmith and machine shops, etc.

On my last inspection of this mine I measured 40,000 cubic feet of air a minute passing into the mine, divided into two splits.

In the North side split there was 18,000 cubic feet of air a minute passing for the use of forty men and five horses.

In the South side split there was 15,000 cubic feet of air a minute passing for the use of thirty-eight men and two mules.

I found a small quantity of explosive gas in a crosscut off No. 8 Right level and in a crosscut off No. 9 Left level, No. 3 North slope. Timbering and roadways were in good condition and the mine free from coal-dust.

Tests made with the Burrell gas-detector were as follows: North side split showing two-tenths of 1 per cent. methane in 20,000 cubic feet of air a minute; South side split showing two-tenths of 1 per cent. methane in 16,500 cubic feet of air a minute; main return showing three-tenths of 1 per cent. methane in 43,000 cubic feet of air a minute.

The following are the official returns from the No. 5 South Wellington Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	60,488			
" export to United States				
" " other countries				
Total sales		60,488		
Lost in washing	25,970			
Used in making coke				
Used under colliery boilers, etc	3,851			
Total for colliery use		29,821		
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } stock during year				
Output of colliery for year		90,309		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	8		2		10	
Whites—Miners	149				149	
Miners' helpers						
Labourers	38		15		53	
Mechanics and skilled labour	3		10		13	
Boys			8		8	
Japanese						
Chinese	1		21		22	
Indians						
Totals	199		56		255	

East Wellington Coal Company Colliery at Nanaimo.

Officers.	*Address.*
H. W. Maynard, President,	Vancouver, B.C.
R. S. Jones, Treasurer,	Minneapolis, Minn.
J. S. Grant, Superintendent,	Nanaimo, B.C.

EAST WELLLINGTON COLLIERY.

John John, Manager; Samuel K. Mottishaw, Fireboss.

This new slope is situated about 500 yards west of the British Columbia Coal Mining Company's old mine known as the Jingle Pot.

This slope was unwatered in July of the present year and operations started, but were discontinued some time in September. The Main slope is down a distance of 611 feet from the surface, 6 by 12 in the clear, and well timbered. The counter-slope was driven about 86 feet, 6 by 12 in the clear; 155 feet of crosscuts driven, 6 by 10; a sump made on the left side of the Main slope, 6 by 12 by 30; and a pump installed to take care of the surface water.

Surface Work completed.—Ten acres of land cleared and prepared for buildings; two 60 by 16, 200-horse-power boilers installed and equipped; two air-compressors, one 14 by 18 C-2 and one 16 by 16 C-2, installed and equipped; one hoisting-engine at pit-mouth; all air and steam lines completed; one blacksmith-shop and equipment; one machine-shop; three air-receivers; one water-tank, 35,000-gallon capacity; 700 feet railway spur completed from main line to pit-mouth, also 1,200 feet of mine-tracks all completed; engine-house, boiler-house, and compressor-house all completed; mine-fan of 5,000-cubic-feet capacity installed and equipped with pipes, etc., leading to and from same; water and air lines all completed to bottom of shaft.

When I made my last inspection of this mine in August I measured 4,000 cubic feet of air a minute passing into the mine for the use of seven men.

No explosive gas found. Timbering and roadways were in good condition and the mine free from coal-dust.

No production was made by this mine in 1920.

THE ADIT MINE (OLD WELLINGTON COLLIERY).

Thomas Budge, Manager; Henry Shepherd, Fireboss.

The coal rights covering an area of about 600 acres at North Wellington have been leased from the Canadian Collieries (Dunsmuir), Limited, by Alfred G. King, Jr., and Edward Foster, who are operating under the firm-name of "King & Foster." There are under this area the following old mines: No. 1 slope, the Adit mine, and Nos. 2 and 3 shafts. These mines were operated by R. Dunsmuir & Sons and were closed some years ago. The lessees commenced in the middle of November to make an entry into the Adit mine for the purpose of recovering the pillars and the outcrop coal. The Adit mine was one of the first mines opened and operated by the late R. Dunsmuir.

I inspected all accessible parts of the mine in December and found it free from explosive gas and ventilation fair; timbering and roadways were in good order and the mine free from coal-dust.

COMOX INSPECTION DISTRICT.

REPORT BY THOMAS R. JACKSON, INSPECTOR.

I have the honour to submit herewith my annual report of inspection of the various coal-mines in my inspectorate for the year ending December 31st, 1920. They consist of the Canadian Western Fuel Company's No. 1 and Protection shafts, Nanaimo; the Canadian Collieries (Dunsmuir), Limited, Cumberland, Comox mines Nos. 4, 5, 6, and 7; and the Pacific Coast Coal Mines, Limited, Victoria, Suquash Colliery, Suquash, near Alert Bay, Vancouver island. A short description is given of each colliery, with the names of the certificated officials.

FIRST-AID AND MINE-RESCUE WORK.

I have much pleasure in being able to report good progress in both classes of work. The Nanaimo Western Fuel Company's "miners' first-aid team" (Captain Barton) won the Coderre cup, which can only be competed for by miners. In winning this trophy, and because they had obtained the highest number of marks for their work, they also scored a higher achievement in the realm of first aid by winning the Montizambert cup, representing the championship of Canada, which is open for competition to all classes of labour. The competition took place throughout the whole of Canada and was held under the auspices of the St. John Ambulance Association. Dr. Hodgetts, of Ottawa, was the examiner. Such an achievement by the miners should be highly appreciated.

The above company is much interested in assisting and encouraging its employees in this branch of humane labour. A number of men have taken advantage of the opportunity presented to acquire first-aid knowledge. Many of them have obtained their St. John Ambulance certificate. It is to be hoped the interest manifested in the work this year will be continued, if not greatly exceeded, next year, and a better position occupied by the various organizations at work in methods of self-aid.

Working in the mine is a more or less hazardous occupation, and because of that it behoves each worker to recognize the value and necessity of first-aid training, so that, should occasion arise, help to the injured could be rendered immediately, thus minimizing the delay and danger generally associated with accidents.

In mine-rescue training-work fairly good results have been maintained throughout the year. Quite a number of men have taken a training course, and in consequence of their efficiency have obtained the Government's mine-rescue certificate of competency.

The station at Nanaimo is under the supervision of J. D. Stewart, who conducts it in a practical and educational way. Mine-rescue practices are performed with approved Gibbs and Paul breathing apparatus. Volunteers actuated by a desire to become proficient in this class of work deserve to be appreciated. No emergency calls were demanded of the rescue-station, although it is always ready to respond to them.

SAFETY-FIRST WORK.

In the fall of 1917 the company appointed a safety engineer to make visits of inspection to all its collieries, surface and underground, including the wharf and machine-shops, with a view of diminishing the number of accidents which were taking place. This inspection is still being continued. To Arthur R. Wilson is allotted the duty of endeavouring to "prevent" accidents happening by methods of education and suggestion, and encouraging the employees to adopt the "safety-first idea" as the surest and best safeguard to personal security. George Yarrow, the company's mine-rescue instructor, occasionally supplements these visits of inspection.

The Canadian Western Fuel Company.

NANAIMO COLLIERY.

Robert Laird, Manager.

No. 1 SHAFT, ESPLANADE.

Edward A. Courtney, Overman; Robert Adams, William Johnson, Elias Rogers, S. K. Mottishaw, William Halliday, John Hamilton, James McMeakin, James Dudley, Thomas Blenkhorn, George Gardine, Joseph Dykes, James Brown, Joshua Norris, Thomas J. Woods, George Perry, and John Shipley, Firebosses, North Side.

This mine is situated at the south end of the Esplanade and adjacent to the bay shore-line. It is the oldest working-pit in Nanaimo district and has a large submarine area. The mine has three openings. Two of them are in daily operation, No. 1 shaft and Protection shaft. The latter is situated on Protection island. The third opening is Newcastle shaft. A ladder extends from top to bottom of this shaft, by which one can enter or leave the mine. It is used only for inspection or necessity. The shaft also forms the exit for the return air of Newcastle airway.

The men working in Protection mine are conveyed by scow to and from there. No. 1 shaft provides passageway for the men employed in the South side of mine.

Electric lamps of the Edison type are mostly used. The balance of lamps are of Wolf type. Douglas and Newcastle seams are worked. On the South side of mine the Douglas seam is worked exclusively. On the North side of the mine coal is taken from both seams. In blasting nothing but permitted explosives are used and fired by cable and electric battery. Compressed air and electricity are used as motive power for haulage and drainage purposes. The three Prescott pumps are driven by steam; so is the endless haulage-rope and Diagonal slope engines; all of them are situated at the shaft-bottom.

The North side haulage system consists of heavy steel rails and copper trolly-wire on the Main level, approximately 3 miles in length, extending from No. 1 shaft to the foot of Lamb's incline. Five motors are used, four constantly running and one acting as a spare. Four of them are of the Edison type and one Westinghouse 10-ton type; all are spring-trolly connected. Horses and mules with drivers are used to take the cars to the faces and return with loaded cars to the main roads. Small and large winches are employed to attend to these cars and place them on the motor-level. The motors haul them to the shaft-bottom.

The South side haulage system consists of direct, endless, and main and tail. The workmen are supplied with cars in a similar way to North side of mine, with this difference: instead of motors hauling the cars to the shaft-bottom, engines and ropes are used to perform the work.

Development-work done in South Side, No. 1 Mine.

The reopening of the Main slope has been continued to a point 6,400 feet from the shaft, where two rock tunnels were started to the south, known as No. 8 South levels. These levels have been driven a distance of 450 feet, but so far only small pockets of coal have been found. The No. 8 North levels off the Main slope have been driven in a distance of 510 feet, but no coal has been found as yet. Prospect-work has been done in No. 5 North level off the Main slope; it has been driven a distance of 500 feet with results not satisfactory. At No. 4 South level off Diagonal slope two rock tunnels have been driven a distance of 600 feet with good results. The main levels are still being continued. No. 3 level has been reopened and heavy steel laid for a distance of 3,000 feet. Active development-work will be started at the beginning of the year in a large area lying to the east of this point.

North Side, No. 1 Shaft.

In the Douglas seam the work done is chiefly the extraction of pillars; the thickness of the seam varies from 3 to 7 feet. The Newcastle seam averages 3 feet in thickness and is worked by the long-wall system. Most of the output of coal is produced by mining-machines. The machines used are Pick-quick and Siskoll. Where the ground is faulty or the face-line not extensive the mining is done by a Siskoll machine; where there is sufficient length of face to warrant it the Pick-quick machine is used. Both machines are regarded as giving good results. Compressed air is used to drive them. Both machines undercut the coal to a depth of 6 feet, after which it is drilled and shot down. The brushing is taken out the floor to admit the car to the face. Car carries about 16 cwt. of coal. Regulation size of place equals 12 yards, with roadway in centre. Loaders load out the coal into cars. Eight loaders are supervised by one shotlighter, or fireboss. Four loaders are supervised by one faceman, who is a certificated miner. A loader does not need a miner's certificate to load coal. Portions of the long-wall face are worked by diggers.

At present coal from the pillars in the Douglas seam is being taken from the following sections in the North side of the mine: No. 1 wall, Protection slope, and Lamb's incline.

The ventilation of these districts is produced by a Guibal fan, 9 by 18 feet, rope-driven at 70 revolutions a minute by a 100-horse-power engine. This fan is capable of producing 100,000 cubic feet of air a minute at a 2-inch water-gauge.

During my last inspection I measured 47,600 cubic feet of air a minute passing up Protection slope, divided into four splits.

Protection Pillars Section.—There was 7,000 cubic feet of air a minute passing for the use of twenty-four men and four horses. Roadways, timbering, and ventilation good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed no methane in return air of this section.

No. 3 Longwall Section.—There was 12,360 cubic feet of air a minute passing for the use of fifty men and eight horses. Roadways, timbering, and ventilation good. Found no gas and

section free from coal-dust. Burrell gas-detector showed 0.2 per cent. of methane in return air of this section.

Lamb's Incline Section.—There was 7,200 cubic feet of air a minute passing for the use of thirty-two men and seven horses. Roadways, timbering, and ventilation good. Found a little explosive gas in roof of roadway in first right place of slant, Poverty row. Burrell gas-detector showed 0.4 per cent. of methane in return air of this section.

Upper Seam Section, No. 1 Wall.—There was 4,800 cubic feet of air a minute passing for the use of sixteen men and three horses. Roadways, timbering, and ventilation good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed 0.1 per cent. of methane in the return air of this section.

In 23,000 cubic feet of air a minute passing in Newcastle airway Burrell gas-detector showed 0.3 per cent. of methane. In 68,000 cubic feet of air a minute passing near to upcast shaft to fan Burrell gas-detector showed 0.2 per cent. of methane.

South Side, No. 1 Mine.

Moses Woodburn, Frank Green, Alex. Coombs, James S. Brown, William Neave, George B. Bradshaw, Thomas Thomson, and Matthew Broderick, Firebosses.

The workings are all in the Douglas seam, and with the exception of No. 4 South level consist of the extraction of pillars. The seam varies much in thickness and inclination. Some parts as low as 2 feet; other parts as high as 24 feet. Inclination running from horizontal to 35° pitch. During the past year a fire arising from spontaneous combustion took place in No. 2 South level workings, causing them to be abandoned and sealed off. An attempt is being made to enter these workings from No. 4 South level. Three sections are being worked which have stoppings so arranged that should a fire take place in any one of them they can almost immediately be sealed off. Practice of this kind, to a great extent, relieves the worry, anxiety, and trouble connected with controlling a fire which suddenly starts up in a section.

The Main slope has been standing idle for a few months while repairs are being made to No. 7 big winch, which does the hoisting in this slope. It is expected to recommence operations prospecting for coal in No. 7 about the beginning of the year.

The ventilation is produced by a 72- by 90-inch double-inlet Sirocco fan, rope-driven, ratio 3½ to 1, capable of producing 195,000 cubic feet of air a minute at a 4-inch water-gauge, and is driven by an engine of 350 horse-power. Another fan capable of producing the ventilation of the mine stands ready to substitute should necessity require.

During my last inspection I found the following conditions to prevail: Measured 36,000 cubic feet of air a minute passing down Diagonal slope at overcast, divided into four splits.

No. 4 South Level Section.—There was 8,400 cubic feet of air a minute passing for the use of forty men and eight horses. Roadways and timbering good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed 0.1 per cent. methane in 10,000 cubic feet of return air from this section.

Right Incline Section.—There was 3,100 cubic feet of air a minute passing for the use of twelve men and three horses. Roadways and timbering good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed 0.2 per cent. of methane in return air of this section.

Simms Dip Section.—There was 4,500 cubic feet of air a minute passing for the use of twenty men and three horses. Roadways fair; timbering good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed 0.2 per cent. of methane in 6,500 cubic feet of return air of this section.

Farmer's Incline Section.—There was 5,760 cubic feet of air a minute passing for the use of eighteen men and four horses. Roadways and timbering good. Found no gas and section fairly free from coal-dust. Burrell gas-detector showed 0.5 per cent. of methane in 7,200 cubic feet of return air in this section.

Burrell gas-detector showed 0.2 per cent. of methane in 25,320 cubic feet of air a minute passing in South side return at No. 3 door. Main return air from South side of mine, measured and tested at entrance to bottom of upcast shaft to fan, showed no methane in 50,000 cubic feet of air a minute passing.

The following are the official returns for the Nanaimo Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
Tons of 2,240 lb.	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	176,577			
" export to United States	62,447			
" " other countries	3,488			
Total sales		242,512		
Used in making coke				
Used under colliery boilers, etc.	48,078			
Total for colliery use		48,078		
		290,590		
Stocks on hand first of year	24,096			
" last of year	3,946			
Difference taken from stock during year		20,150		
Output of colliery for year		270,440		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	22		19		41	
Whites—Miners	159	5.75 - 9.01			159	
Miners' helpers						
Labourers	160	5.75 - 6.29	72	5.82 - 6.27	232	
Mechanics and skilled labour	74	6.29 - 6.97	61	6.36 - 7.62	135	
Boys	20	3.52 - 5.75	11	2.58 - 4.83	31	
Japanese						
Chinese			54	3.13 - 4.33	54	
Indians						
Totals	435		217		652	

The Canadian Collieries (Dunsmuir), Ltd.

COMOX COLLIERIES.

Charles Graham, District Superintendent.

These mines are situated in the Comox district, about 17 miles from Union Bay. A railway about 20 miles in length connects the various mines to a shipping-point at Union Bay, over which the whole output of coal is conveyed. The mines in operation are Nos. 4, 5, and 7. Those not operating are Nos. 6 and 8. No. 4 mine is located at the south end of Comox lake and is about 3 miles distant from the city of Cumberland. No. 5 is situated about a mile from the city. No. 7 mine is located at the town of Bevan, nearly 6 miles in a northerly direction from the city of Cumberland. No. 6 mine is close to the city. No. 8 mine is about 2 miles north of Bevan.

In the Tsable River coalfield there are two diamond-drills in operation. A total of 7,450 feet of boreholes has been drilled and 137,000 feet of roadway built. A survey has been completed for a railway between where the mine is located and Union Bay, about 6 miles in length.

The hydro-electric plant has been in constant operation throughout the year. The power-house has been operated satisfactorily and no repairs or improvements were required. Sufficient electricity is generated at this plant to supply motive power to all the collieries; also the wharf at Union Bay, including the lighting of this town and the city of Cumberland.

FIRST-AID AND MINE-RESCUE WORK.

I have much pleasure in being able to report that active interest is displayed in Cumberland district regarding first-aid and mine-rescue work. A number of men have studied first aid and qualified for the St. John Ambulance certificate.

A knowledge of the principles of first-aid treatment to the injured is becoming more and more of a necessity to the mine-worker. The subsequent trouble and danger arising out of delay of self-aid cannot be too prominently brought before their notice, nor can the advantages resulting from a prompt and timely application of first aid be too conspicuously placed before them. In the first-aid competition held under the auspices of the St. John Ambulance Association, and covering the whole of Canada, the Cumberland No. 4 mine surface "first-aid" team (Captain Taylor) won second honours in the Coderre cup.

Quite a few men have qualified for mine-rescue certificates at the mine-rescue station, Cumberland. The supervising officer in charge of this station is John Thomson. The station consists of six Draeger apparatus which are used to train the men. In addition, lectures are given on the subject by the instructor. Ten lessons of two hours' duration each constitute a complete course, performed in a training-gallery filled with irrespirable gaseous fumes and other conditions similar in character to that in which a mine would be after a fire or explosion. The training is difficult to perform; therefore much credit is due the men who willingly and voluntarily carry on this work.

The rescue-station has always been ready to meet emergency calls, but no demands were made during the year.

SAFETY-FIRST WORK.

At the beginning of the year the company appointed George O'Brien as safety engineer. His duty consists of visiting all the collieries, surface and underground, and the wharves connected with these collieries in Comox and Extension districts. His object is to "prevent" accidents from happening by spreading and encouraging safety-first ideas; by persisting in stricter adherence to the rules governing the workmen's own personal safety; to check up carelessness and disregard and to offset the pernicious evil habit of "taking chances" either in or out of the mines. In addition to the coal-mine regulation notices which are in evidence, safety-first notices in large letters are posted up in conspicuous places at the different collieries, printed in four languages, warning the workmen to strictly observe the rules and suggestions laid down for their guidance. Electric safety-bells are in operation at the entrance to Nos. 4 and 7 slope mines. The trip of cars coming out or going in the mine causes the bells to ring, thereby warning the passer-by of approaching danger.

No. 4 Mine, Comox.

William Walker, Manager; Robert Adamson, Overman, No. 1 Slope; Charles Parnham, Overman, No. 2 Slope; James Quinn and Charles O'Brien, Shiftbosses; Sidney Horwood, Alfred Jones, Hugh M. Davidson, Peter Myers, Richard H. Hodson, Daniel P. Marsh, John Liddle, William Beveridge, Louis Franchesini, Robert Reid, Norman W. Huby, John C. Brown, H. King, D. P. Marsh, Thomas Lewis, A. W. Watson, Fred Hutchison, John Bennie, and John Taylor, Firebosses.

This mine consists of two slopes with one main entrance. No. 1 slope is 7,000 feet in length, running due north. No. 2 slope is 9,000 feet in length, running N. 45° E. These slopes diverge at a point about 75 feet from the main portal. The electric haulage-engine is so connected that trips can be run simultaneously on both slopes to a point where both slopes converge to the main opening.

The men are conveyed from the bottom of these slopes in a man-trip at the end of each working-shift. A safety-car is connected to the rear car of the empty trip, which ensures the workmen's safety while riding up the slopes.

This car was invented and made by Robert Turnbull, blacksmith, Union Bay, one of the company's employees. It is a credit to the ingenuity of the maker for its simplicity of construction, strength, and safety. A demonstration of the action of the car was given to all the miners one afternoon at 3 o'clock. Complete satisfaction was manifested by all officials and employees present at the safety-car's efficiency of action. The test was made with twelve loaded cars. It has been in use for the past eight months and is giving the best of satisfaction.

The ventilation is produced in this mine by a Sullivan reversible fan driven by a 350-horse-power motor, direct-coupled, running at 245 r.p.m., and capable of delivering 196,000 cubic feet of air a minute, against a 7-inch water-gauge.

This mine has been in continuous operation during the year. Safety-lamps of the Wolf type are used by the firebosses; electric lamps of the Edison storage-battery type are used by all the other employees. Where blasting is done only permitted explosives are used and fired by electric battery. During the month of November an average of 11 tons of coal was obtained with 1 lb. of explosive.

No. 1 Slope.

Electricity is used as the motive power to operate all pumps, winches, and coal-cutting machines. A long-wall system of mining coal has been established in part of the West side workings of No. 4 slope. Undercutting is done by a Sullivan type of coal-cutting machine. Miners digging coal by the long-wall system also work in this section. Loaders are employed to load out the machine-mined coal. Certificated miners supervise the timbering and general safety of the loaders. Pillars are also extracted from the upper left of East side section. Formerly this seam was all worked by the pillar-and-stall system.

In the East side of No. 4 slope the pillar-and-stall method is in practice. A Sullivan type of coal-cutter does the undermining. The seam throughout this mine varies from 3 to 7 feet in thickness.

Haulage from the faces is done by drivers with mules to No. 4 slope. A winch situated at the top of this slope, on No. 15 West level, attends to the delivery of cars. A 5½-ton Ironton storage-battery locomotive is used for hauling on above level to the bottom of the Main slope, the source of supply. A recharging apparatus has been installed in above level, so that when necessary the motor can be run into the station and recharged.

During my last inspection in December I measured 27,540 cubic feet of air a minute passing into this part of the mine, divided into two splits.

In No. 1 split there was 11,000 cubic feet of air a minute passing for the use of fifty men and five mules, or an average of 169 cubic feet of air for each unit employed. Ventilation, roadways, and timbering were, in general, good and sections fairly free from coal-dust. I found a little gas in the roof at the face of No. 1 slant and in first left place off same, No. 4 West level, and gas-caps of ¼ inch in three places off No. 1 East level and five places off No. 4 West level. No shooting was being done.

In No. 2 split there was 12,540 cubic feet of air a minute passing for the use of fifty-five men and six mules, or an average of 171 cubic feet of air for each unit employed. The ventilation was fairly good, roadways in fair condition, timbering good, and sections fairly free from

coal-dust. I found a gas-cap varying from ⅛ to ¼ inch in No. 20 West pillars. No blasting is permitted in this section of the mine.

No. 2 Slope.

The long-wall system of mining coal is in practice in New slope off No. 20 East level. Miners dig the coal at present, but mining-machines will follow later. Extraction of pillars is conducted in the remainder of the mine, with the exception of No. 15 East level, where by driving a slope preparations have been made to reach some coal which so far has not been touched. The seam in this mine varies from 3 to 7 feet in thickness.

The haulage system is much similar to that which obtains in No. 1 mine, except the motor. A line of wood stoppings is to be built to shut off all the abandoned workings in the East side of the mine, leaving the pillars to be worked, and new work developed outside of this point.

It is proposed to substitute the present fan with a Sirocco one capable of delivering 300,000 cubic feet of air a minute. There is working at present a new electric-driven machine-gun for forcing cement on the face of the ventilating stoppings in both slopes. This will have the effect of reducing the leakage through these stoppings and considerably augment the quantity of air to be found at the bottom of the slopes.

During my last visit of inspection of this mine I measured 31,000 cubic feet of air a minute passing into this part.

In No. 1 split there was 6,000 cubic feet of air a minute passing for the use of twelve men and a mule, or an average of 400 cubic feet of air for each unit employed.

In No. 2 split there was 20,000 cubic feet of air a minute passing for the use of fifty-five men and eight mules, or an average of 253 cubic feet of air for each unit employed. I found the ventilation and timbering good, roadways in fairly good condition, and sections fairly free from coal-dust.

A ⅜-inch gas-cap was found in No. 16 East pillars, and a small quantity of gas in No. 15 pillars off No. 18 East level; the place was fenced off. Also a little gas in roof-cavity of No. 2 place, New slope, off No 20 East level.

I made Burrell gas-detector tests in the various returns, with the following results: No. 1 split return, No. 1 slope, in 21,600 cubic feet of air a minute passing there was 1.2 per cent. methane; No. 2 split return, No. 1 slope, in 10,000 cubic feet of air a minute passing there was 1.9 per cent. methane; in No. 2 slope return there was 30,000 cubic feet of air a minute passing with 1.7 per cent. methane; in the main return near the fan there was 160,000 cubic feet of air a minute passing with 0.7 per cent. methane.

No. 5 Mine, Comox.

John L. Williams, Manager; Robert Brown, Overman; Frank Crawford, Shiftboss; Duncan Thomson, Thomas Eccleson, Samuel Jones, William Devoy, Thomas Shields, James Brown, John E. Spicer, William Harmison, James Monks, and William J. Keenan, Firebosses.

The workings of this mine are reached by a shaft 280 feet deep. Electricity is used for hoisting, winch-driving, pumps, coal-cutting machines, and operating Main level 6-ton motor, trolly-connected. A 5½-ton Ironton motor has recently been installed on level 1,000 feet in length at foot of No. 2 dip. A recharging-station has been fitted up on the level. Formerly mules were used to haul the coal.

All the workings at present are in the Upper seam. Long-wall and pillar-and-stall systems are employed. Sullivan type of coal-cutters are principally used in stalls. Depth of undercut, 6 feet; height of seam varies from 2 feet 6 inches to 7 feet. Inclination of seam varies from horizontal to 6°. Coal-loading from the machine-cut face is done by loaders supervised by certificated miners.

In the long-wall the coal getting and loading is done by certificated miners and helpers. Firebosses do the shooting in both cases. No blasting is done without the use of cable and electric battery. Only permitted explosives are allowed. Electric safety-lamps of the Edison type are mostly used. Firebosses use safety-lamps of the Wolf type. Part of the output is produced by extraction of pillars.

During my last inspection of this mine I measured 30,000 cubic feet of air passing into the West side tunnel, divided into two splits.

West Split.—There was 12,000 cubic feet of air a minute passing for the use of twenty-six men and two mules.

East Split.—There was 12,000 cubic feet of air a minute passing for the use of twenty-four men and three mules.

No. 1 Dip Section.—I found 30,240 cubic feet of air passing down this slope. There was 16,000 cubic feet of air a minute passing for the use of twenty-four men and two mules. General conditions of mine good. I found a little explosive gas at face of No. 4 West level crosscut off No. 1 dip. The sections were free from coal-dust.

No. 2 Dip Section.—There was 11,200 cubic feet of air a minute passing for the use of thirty-four men and five mules. General conditions of mine good. I found no gas and sections were free from coal-dust.

The following represents the quantities of air passing in the different return airways of No. 5 mine, also the percentages of methane in air obtained with Burrell gas-detector; East side split, 14,000 cubic feet a minute, methane 0.3 per cent.; West side split, 9,600 cubic feet a minute, methane 0.2 per cent.; West side No. 1 dip, 23,914 cubic feet a minute, methane 0.2 per cent.; No. 2 dip, *nil;* main return at fan, 100,800 cubic feet a minute, methane 0.1 per cent.

No. 6 Mine, Comox.

John L. Williams, Manager; Thomas Mordy, Overman.

There has been no coal hoisted from this mine during the year. Practically all the water made in both Nos. 5 and 6 mines is hoisted from No. 6 shaft by specially constructed tanks capable of delivering 1,200 gallons of water a minute. During my last inspection I measured 24,000 cubic feet of air a minute entering this mine. I found no explosive gas. Timbering and roadways were in fair condition.

No. 7 Mine, Comox.

John G. Quinn, Manager; James L. Brown, Overman; William Herd, Watkin Williams, and Robert Walker, Firebosses.

The workings of this mine are reached by a slope 2,000 feet in length, dipping about 6°. An electric hoist attends to the hauling. The mine has been operating all year. Upper seam is worked. It is confined to solid workings off New slope at end of No. 3 East level, 4,100 feet from Main slope. Longwall and pillar-and-stall systems of working. Seam varies in height from 30 inches to 7 feet. Inclination varies from horizontal to pitch of about 6°.

Electricity is chiefly used for haulage and drainage purposes. Compressed air is slightly used. The output of coal for each day has been doubled within the last month. A Sullivan-Rand mining-machine is being introduced, which is adapted for undercutting coal in stalls or long-wall. Length of cutting-bar, 4½ feet.

The fan producing ventilation for this mine is a double-inlet Sirocco 9 feet in diameter, driven by a 350-horse-power motor, speed 240 r.p.m., direct-connected. Quantity of air produced, 110,000 cubic feet a minute; water-gauge, 6 inches.

Electric safety-lamps of the Edison type are used exclusively. The firebosses use a Wolf safety-lamp. Only permitted explosives are used for blasting rock or coal, and fired by a cable and electric battery.

During my last inspection I found 29,000 cubic feet of air a minute passing near head of New slope off No. 3 East level for the use of forty-five men and four mules. The general conditions of the mine are good. Found no gas and sections free from coal-dust.

I measured the quantity of air entering the fan-drift and obtained 100,800 cubic feet a minute. Test made with Burrell gas-detector registered 0.1 per cent. of methane.

The following are the official returns from the Comox Collieries for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	278,489			
" export to United States	93,277			
" " other countries				
Total sales		371,766		
Sales to employees	5,428			
Used under colliery boilers, etc.	5,919			
Lost in washing	79,186			
Total for colliery use		90,533		
		462,299		
Stocks on hand first of year	11,357			
" last of year	4,972			
Difference taken from stock during year		6,385		
Output of collieries for year		455,914		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage
Supervision and clerical assistance	57		34		91	
Whites—Miners	186				186	
Miners' helpers						
Labourers	98		100		198	
Mechanics and skilled labour	46		145		191	
Boys	13		14		27	
Japanese	78		1		79	
Chinese	350		190		540	
Indians						
Totals	828		484		1,312	

Name of seams or pits—Comox mines.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 4, 5, and 6 shafts and Nos. 4 and 7 slopes.

Pacific Coast Coal Mines, Limited.

SUQUASH COLLIERY.

Samuel D. Wark, Manager.

This colliery is situated about 12 miles west of Alert Bay, on Vancouver island. It has been idle since the latter part of the year 1914. At the beginning of June, 1920, operations were started to dewater this mine and get everything in readiness for again operating. This work has been progressing steadily during the year. The roadways are being cleaned and retimbered throughout the mine. No coal has been mined for shipment during the year, but sufficient has been mined to supply the colliery boilers and for household purposes for the employees.

The underground work, cleaning up and timbering, has now almost reached completion. Beginning early in the new year, it is expected that a vigorous policy of development and construction will be inaugurated. A second opening will be driven to tap the seam on a grade of 1 in 6 and wide enough for two tracks to accommodate an endless-rope system of haulage. Simultaneously with the driving of the slope a modern tipple and washery will be erected, also wharves, bunkers, and railway.

The development done at this mine to date is as follows: A shaft 6 by 10 feet in the clear is down 170 feet, with a midwall between. One compartment is used for hoisting and also serves as downcast, and the other compartment is used for an upcast. Parallel levels are driven from the shaft-bottom; one pair N. 45° W. and the other pair S. 45° E. The North-west levels have been driven approximately 500 feet. The South-east levels have been driven a distance of 1,200 feet, and long-wall exclusively has been opened out in this level; there being twenty-six places ready for operating on this face. Two hundred feet from the shaft, on the South-east levels, a pair of slopes are driven N. 45° E. for a distance of 1,700 feet. On the same level, 800 feet from the shaft-bottom, another pair of slopes have been driven N. 45° E. for a distance of 750 feet.

The coal is of excellent quality, is very hard, and practically smokeless. The thickness of seam averages about 6 feet.

Permanent installations at this colliery are as follows: One Goldie-McCulloch high-pressure boiler, 100 horse-power; two Goldie-McCulloch high-pressure boilers, 150 horse-power each, have been installed and foundations are in place for two more; a pair of winding-engines, 24- by 36-inch cylinders and 9-foot drum; permanent buildings, covering all machinery installed, have been erected; and superintendent's residence and a model bunk-house of thirty-six rooms have been erected. There are also ten four-roomed houses, ten two-roomed houses, and a large store building. Telephone communication is established with the wireless station at Alert Bay.

A generator and engine have been installed to furnish light for the buildings of the plant and dwellings. The ventilation of the mine is produced by a steam-driven Sheldon fan, 4 by 2½ feet, making 125 revolutions a minute.

During my last visit of inspection to this colliery I found it being reopened. Part of the mine had been dewatered, roadways cleaned up and timbered. The ventilation was fair and I found no gas.

The following are the official returns from the Suquash Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada				
" export to United States				
" " other countries				
Total sales				
Used in making coke				
Used under colliery boilers, etc.	125			
Total for colliery use		125		
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } stock during year				
Output of colliery for year		125		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance			1	9.00	1	9.00
Whites—Miners	2	6.08			2	6.08
Miners' helpers	1	6.08			1	6.08
Labourers			1	5.55	1	5.55
Mechanics and skilled labour			1	6.44	1	6.44
Boys						
Japanese						
Chinese						
Indians						
Totals	3		3		6	

Name of seams or pits—Suquash No. 1 mine, No. 1 seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—One shaft 6 by 10 feet, with midwall, one side for hoisting and one side for ventilation. From shaft-bottom two levels are driven south-east for a distance of about 1,200 feet; 100 feet from the shaft-bottom two slopes are driven down a distance of about 1,200 feet north-east. About 500 feet from the shaft-bottom another pair of slopes are driven paralleling the above slopes for a distance of 790 feet. The seam is from 6 to 7½ feet in thickness, of good quality, and very hard, being practically smokeless and giving off great heat.

Description and length of tramway, plant, etc.—Two 150-horse-power return-tubular boilers; one 100-horse-power return-tubular boiler; one pair duplex winding-engines, 24- by 36-inch cylinders, with 9-foot conical drums equipped with safety overwinding device, steam-reverse and steam-brake; one electric generator for surface lighting; one donkey-engine with vertical boiler attached; one ventilating-fan producing 14,000 cubic feet of air a minute; two duplex pumps, capacity 50 gallons each. Pit-head and screening arrangement capable of handling 200 tons daily.

NORTHERN INSPECTION DISTRICT.

REPORT BY THOS J. SHENTON, DISTRICT INSPECTOR.

Telkwa Collieries Co., Ltd.

Officers.	*Address.*
W. A. Woodland, President,	Prince Rupert, B.C.
J. K. Ashman, Vice-President,	Smithers, B.C.
T. McClymont, Secretary,	Prince Rupert, B.C.
John Gillespie, Superintendent,	Telkwa, B.C.

TELKWA COLLIERY.

This mine was operated for a period of five months during the year, with an average of three men employed each day, and an output for the same period of 1,400 tons of coal. With respect to conditions of operation, I am pleased to say that the same was in accord with the "Coal-mines Regulation Act." The property has been leased by the company to John Gillespie, former superintendent for the company.

The following are the official returns from the Telkwa Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	1,400			
" export to United States				
" " other countries				
Total sales		1,400		
Used in making coke				
" under colliery boilers, etc.				
Total for colliery use				
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } stock during the year				
Output of colliery for year		1,400		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance						
Whites—Miners	3				3	
Miners' helpers						
Labourers						
Mechanics and skilled labour						
Boys						
Japanese						
Chinese						
Indians						
Totals	3				3	

NICOLA-PRINCETON INSPECTION DISTRICT.

REPORT BY JOHN G. BIGGS, INSPECTOR.

I have the honour to submit my first annual report as Inspector of Coal-mines for the Nicola-Princeton Inspection District during the year 1920.

The companies operating in this district during the year were the Middlesboro Collieries, Limited; Coalmont Collieries, Limited; Princeton Coal and Land Company, Limited; the Fleming Coal Company, Limited; Thompson Valley Coal Company, Limited; and the Harvard Coal Company, Limited.

Mining operations have been suspended by the Harvard Coal Company during the year. A large amount of work has been done by the Coalmont Collieries during the year, chiefly in the construction of surface plant and the installation of machinery and equipment preparatory to commencement of operations of the aerial tramway for conveying the coal from the mine to the tipple to supersede the motor-trucks. A fair amount of development and construction work has been done during the year by the Chu Chua Mine Syndicate.

There have been two accidents reported during the year; one proved fatal and one serious. The fatal accident occurred at the Middlesboro Colliery, No. 7 mine, owing to a cave of roof-rock swinging the timbers. The other happened outside of the mine at Chu Chua, where a workman fell from a scaffold of about 6 feet and sustained serious injuries.

The various mines have not been worked to capacity during the year and there has been a fair amount of idle time. The mining companies evidently depend upon the local trade rather than to compete outside the district. Next year the Coalmont Collieries should become a large producer, which should make a big increase in the output of coal for this district.

During the year inspections on behalf of the workmen, as provided for by section 91 of the Act, have been made at all the larger mines, and the conditions as reported have been found to be very favourable and no reports have been made as to the existence or apprehended existence of any danger.

MINE-FIRES.

Mine fires at some of the older mines have been a serious source of trouble in this district, having been experienced at the Nos. 4 and 7 mines of the Middlesboro Collieries, Limited, Princeton No. 1 mine, and the Fleming Coal Company's No. 3 mine, Coal Hill. During the year 1920 we have been somewhat fortunate in having no new outbursts, with the exception of Coal Hill No. 3 mine, where an old fire that had been sealed off sprang into activity, which necessitated the mine being abandoned and sealed off; however, the life of the mine was very limited and the small amount of coal in the pillars did not warrant any work being done to save it.

The coal-seams in this district are very susceptible to spontaneous combustion, and any slack coal or crushed pillars left in the gobs are subject to heating and may soon spring into activity. These mine fires are extremely hard and costly to deal with owing to the soft nature of the coal. In but few cases is the sealing-off successful to the extent of extinguishing the fires.

It seems unfortunate that there has not been more attention given to this source of trouble, and surely we will receive some knowledge from these costly and dangerous experiences. The chief object in view should be to obtain a system of ventilation and mode of working that will tend to eliminate this destructive and dangerous element.

The Edison electric mine safety-lamp is in general use for the workmen at the Middlesboro, Princeton, and Coal Hill mines, while open lights are being used by the workmen at Coalmont and the Chu Chua mines.

The mines are examined by certified officials with locked safety-lamps. The Coalmont Collieries have Edison safety-lamps on order, which will be installed immediately upon arrival.

MINE-RESCUE WORK.

The standard of the mine-rescue work in this district is not of a high standard, with the exception of the Government station at the Middlesboro Collieries, which is well maintained. The condition of the apparatus and the lack of interest taken does not approach anything that one would desire. The rescue apparatus which has been established by the different mining companies is of the Draeger type, but is not maintained in an efficient and workable condition for immediate use.

The Government station situated at the Middlesboro Colliery is kept in a high state of efficiency, and great credit is due to the caretaker, Mr. Stone, for the care and attention taken in this station.

While there are a number of employees around the various mines that have taken a course of training, there seems to be a lack of supplementary training, so as to be in a condition to make efficient use of apparatus in case of need.

I am pleased to report that first aid was well maintained during the year. Classes were held in Merritt under the tuition of Dr. Gilles, with a good attendance. There is a great deal of credit due to the members for the time and the interest taken in first-aid work.

I wish to take this opportunity of thanking the workmen and officials of the various mines for the manner in which they have received me in this district, and can assure them that it has been a source of pleasure to find that they have been ever ready to co-operate with me in carrying out my duties as Inspector of Mines. We all should have one object in view, and that is to operate the various mines in a safe and efficient manner, as it is only by this means that we can expect to prevent accidents.

Middlesboro Collieries, Ltd.

Head Office—Vancouver, B.C.

Capital, $1,107,700.

Officers.	*Address.*
E. W. Hamber, President,	Vancouver, B.C.
G. S. Raphael, Vice-President,	Vancouver, B.C.
Thomas Sanderson, Managing Director and Secretary,	Vancouver, B.C.
C. M. O'Brian, Treasurer,	Vancouver, B.C.
Robert Fairfoull, Mine Manager,	Middlesboro, B.C.

Value of plant, $250,000.

MIDDLESBORO COLLIERY.

Robert Fairfoull, Manager.

This colliery is situated 1 mile west of the Merritt Railroad Station and is served with a branch line from the Kettle Valley Railway. The mines operating during the year were the Nos. 4, 4 East, 4 East prospect, and No. 7 mine.

No. 4 MINE.

James Fairfoull, Overman; George Hudson, William Hallinan, Thomas Archibald, Robert Drybough, and Louis Clark, Firebosses.

This mine is the most extensive of the Middlesboro Collieries and is reached by an horizontal rock tunnel crossing the measures cutting the Nos. 4, 6, 8, and 9 seams. Only the Nos. 6 and 8 seams are at present being operated, which have been connected to the surface at the croppings for ventilation purposes. The method of working is the pillar and stall, pillars being left 50 feet square and the stalls being driven 10 feet wide.

These seams lie at an angle of 25° and are about 6 feet thick. Chutes are used for conveying the coal from the various faces to the levels, where it is loaded into mine-cars, which are collected by horses and taken out to the surface by the means of main and tail haulage.

During the year the mining has been chiefly connected with the extraction of pillars, while the Main level has been driven through the fault at No. 8 and proved the seam. The coal is mined by hand and blasted when required, permitted explosives and electric detonators being used.

Ventilation is produced by a double-inlet Sheldon fan 8½ feet in diameter, driven by an Ideal 14 by 18 steam-engine, and is constructed so that the air-current can be reversed if required. At my last inspection it was producing 42,000 cubic feet of air a minute for the use of seventy-two men and three mules. Speed, 120 revolutions a minute, with a 0.5-inch water-gauge; barometer, 27.95 inches; thermometer, 34° F.

The ventilation of this mine I have always found to be good and have not been able to find a trace of explosive gas during my inspections. The mine is free from dangerous accumulations of coal-dust. The working-places and roadways are kept in good condition, while a good supply of suitable timber is provided convenient for the workmen.

No. 4 East Mine.

A. D. Allan, Overman; R. S. Brown, Fireboss.

This mine is situated a short distance to the east of the portal of No. 4 mine and is developed by means of a pair of slopes driven from the outcrop of the No. 4 seam. These slopes have not been driven during the year owing to the faulted nature of the ground. Mining at present is restricted to driving a pair of headings, the work being somewhat of an exploratory nature. The seam in this mine lies at varying angles of inclination and the method of work is pillar and stall. The method of haulage underground is by compressed-air hoist and mules to the Main slope and by steam-hoist to the surface.

The ventilation is produced by a small quick-running fan of the Sirocco type, 4 feet in diameter, driven by a steam-engine. At the time of my last inspection it was producing 14,400 cubic feet of air a minute for the use of eleven men and two mules, running at a speed of 300 revolutions a minute, with a 0.25-inch water-gauge. Barometer, 29 inches; thermometer, 50° F.

The roads and working-places were well timbered and a good supply of suitable timber was provided for the workmen. This mine is free from dangerous coal-dust. Explosives are used when required, which are of the permitted type. Electric detonators are used for firing shots under the supervision of certified shotlighters.

No. 4 East Prospect.

This mine consists of a small area of the No. 4 seam lying behind a fault, with the croppings between Nos. 4 and 4 East mines. Slopes have been driven from the surface, striking the coal at a distance of 80 feet. The method of work is by pillar and stall, and owing to the limited area of the ground, mining is restricted to the driving of a Main level and counter.

The ventilation I have always found to be very good, the roads and working-places to be well timbered, a good supply of suitable timber provided for the workmen, and free from dangerous coal-dust. Explosives are used in this mine when required and are of the permitted type. Electric detonators are used for firing shots under the supervision of certified shotlighters.

No. 7 Mine.

Andrew McKendrick, Overman; Thomas Rowbottom, David Crawford, and Matthew McKibben, Firebosses.

This mine is situated in Coal gully at an elevation of 400 feet above the entrance to No. 4 mine and tipple. This seam is generally considered to be the No. 4 seam and is about 15 feet in thickness, of which the upper 8 feet is being worked and is overlain by a sandstone roof. The method of work is by pillar and stall.

The mine is developed by a pair of slopes driven directly to the dip, which is about 25° west, and at present reach a distance of 2,000 feet. During the present year mining has been carried on only in connection with the drawing of pillars. The coal that is worked to the raise is generally conveyed from the working-faces by chutes to the mine-cars, and by compressed-air hoists from the dip-workings to landings near the Main slope, and to the surface by means of a compressed-air hoist.

The ventilation is produced by a small fan of the Guibal type, driven by a small compressed-air engine. I have always found the ventilation to be very good and no signs of explosive gas have been found.

At my last inspection I found 18,000 cubic feet of air a minute passing into this mine for the use of twenty-three men. Speed of fan, 150 revolutions a minute; water-gauge, 0.4 inch. Barometer, 27.55 inches; thermometer, 34° F.

The working-places and roadways were well timbered and a plentiful supply of suitable timber was provided for the workmen. The mine is naturally damp and free from dangerous accumulations of coal-dust.

Blasting is carried out at all the mines under the supervision of competent persons as provided for in the "Coal-mines Regulation Act." All lamps in use by the workmen are the Edison electric safety-lamp. The officials are provided with safety-lamps of the Wolf type for inspection purposes.

During the latter part of the year preparation has been made for the development of the No. 5 seam on each side of Coal gully. A hoist has been erected and the track laid from near the entrance of No. 7 mine down the side of the hill, and at present there are two rock tunnels being started from each side of the gully.

The coal from the No. 7 mine is brought down a 3-way incline by 2-car trips to a common tipple in cars having a capacity of 1.5 tons, where it is unloaded into a Phillips crossover dump; a switchback and a creeper take the empty cars back, where they are arranged into trips for distribution to the different mines. The coal passes to a shaking screen which allows the small coal to pass into a hopper; the lump passes over a picking-table, where the rock and waste are picked out before being loaded into railroad-cars. A Christy box-car loader is used for loading box cars.

The main power-plant, which is situated near the tipple, consists of four return-tubular boilers with a capacity of 600 horse-power. Compressed air is supplied by a Canadian Rand cross-compound compresser having a rated capacity of 2,200 cubic feet of free air a minute for driving hoists, fans, and pumps. Well-equipped machine, car-repair, and carpenter shops are maintained, besides offices and dwellings for the employees.

Copies of the "Coal-mines Regulation Act," special rules, systematic timbering rules, and plans of the mines are posted near the entrance to the various mines.

A well-equipped mine-rescue station is maintained at the Middlesboro Colliery, where, in addition to their own rescue apparatus, that of the Department of Mines is kept in a high state of efficiency.

The following are the official returns from the Middlesboro Colliery for the year ending December 31st, 1920:—

Sales and Output for the Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	83,059			
" export to United States				
" " other countries				
Total sales		83,059		
Used in making coke				
Used under colliery boilers, etc.	4,445			
Total for colliery use		4,445		
		87,504		
Stocks on hand first of year	36			
" last of year	134			
Difference added to stock during year		98		
Output of colliery for year		87,602		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	12		5		17	
Whites—Miners	48	7.00-12.00			48	
Miners' helpers	20	5.00			20	
Labourers	42	5.00-6.00	22	4.80-5.25	64	
Mechanics and skilled labour			16	5.50-6.40	16	
Boys			8	2.50	8	
Japanese						
Chinese						
Indians						
Totals	122		51		173	

Name of seams or pits—As no new mines were opened in 1920, operations are still confined to No. 4 mine, No. 4 East mine, and No. 7 mine.

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 4 mine: Access to the various sections of this mine is gained by an horizontal level first driven in a portion of the No. 5 seam, then by crosscut tunnels to the Nos. 4, 8, and 6 seams. These seams are about 6 feet thick, pitching south at an angle of about 25°. The method of working is pillar and stall. The coal is usually conveyed from the working-faces by chutes to the mine-cars, then by mules and compressed-air hoists to the tipple. Ventilation is provided by a double-inlet Sheldon fan 8½ feet in diameter, driven by an Ideal 14 by 18 steam-engine. The fan is built so that the air-current can be reversed and is capable of producing an air-current of 90,000 cubic feet of air a minute, against a 4-inch water-gauge. No. 4 East: This slope is situated about 1,200 feet to the east of the tipple. Mining in this mine is restricted to the driving of a main heading and counter in the No. 4 seam. Haulage underground is by compressed-air hoists and mules, then by steam-hoist to the surface. No. 4 East prospect: A small area of coal near the outcrop of No. 4 East being inaccessible from the No. 4 East workings, an entrance was made on the surface connecting with the coal at 80 feet distance. The method of working is pillar and room, the seam being No. 4. No. 7 mine: No changes have been made in or around this mine during the past twelve months, mining being carried on only in connection with the withdrawal of the pillars.

Description and length of tramway, plant, etc.—No additions or changes have been made to the surface plant during the past year; the coal, as in former years, being brought to the surface to a common tipple in cars having a capacity of 1.5 tons, then dumped by a Phillips crossover dump, a switchback and car-haul bringing back the cars for distribution to the different mines. A Christy box-car loader is used for loading the box cars. The main power plant is situated near the tipple and consists of four return-tubular boilers, each 150 horse-power. Compressed air is supplied by a Canadian Rand cross-compound compressor with a rated capacity of 2,200 cubic feet a minute. Electricity for charging Edison lamp-batteries and for lighting purposes is generated by a 27½-k.w. generator. There is also a well-equipped machine-shop, car-repair and carpenter shops, and training-station for mine-rescue work. Water for household and power purposes is supplied from wells sunk near the Coldwater river, these wells ensuring a supply of good water for both purposes.

The Fleming Coal Company, Ltd.

(FORMERLY THE INLAND COAL AND COKE COMPANY, LTD.)

Head Office—Vancouver, B.C.

Officers.	*Address.*
Joseph Martin, President,	315 Credit Foncier, Bldg., Vancouver, B.C.
Joseph Graham, Managing Director,	Merritt, B.C.
A. L. Welch, Secretary-Treasurer,	404 Drake Street, Vancouver, B.C.
A. E. Smith, Manager,	Merritt, B.C.

COAL HILL COLLIERY.

No. 3 MINE.

A. E. Smith, Manager; John T. Brown, Overman; John Smith, Geo. Maxwell, and George Walker, Firebosses.

This colliery is situated south-west of the Middlesboro Colliery, at an elevation of 500 feet above it, and is served by a branch of the Kettle Valley Railway. The mine is sunk on the No. 3 seam at a point about 500 feet higher up the hill than the Middlesboro Colliery, which is the same as that worked at the No. 7 mine, Middlesboro.

A crosscut tunnel extends from the No. 3 seam to the No. 5 seam and both have been worked during the year. The No. 3 seam is about 12 feet thick, while the No. 5 seam is about 5.5 feet; both are worked by the pillar-and-stall method. The pitch varies from 20 to 30°, which allows the coal to be brought from the faces to the levels by means of chutes. During the year all the work has consisted in the extraction of pillars.

Unfortunately, at the latter part of the year a fire which had been sealed off for a number of years revived, when it was found necessary to abandon this mine and seal up the slopes.

Conditions with respect to ventilation and gas I have generally found to be very good. All working-places were well timbered and a sufficient supply of suitable timber was always provided for the workmen.

No. 2 MINE.

A. E. Smith, Manager; John T. Brown, Overman; Geo. Maxwell, John Smith, and Jim Simm, Firebosses.

This mine was opened up the latter part of the year, and is situated about 400 feet west of the entrance of the No. 3 mine; it is being developed by slopes which have been driven a distance of 500 feet, showing a good seam of coal about 6 feet in thickness, intersected with 1 foot of rock and bone, dipping from 20° to 30° S.W.

This seam is being developed by the pillar-and-stall method, the pitch of the seam allowing the coal to be brought from the faces to the levels by means of chutes.

This mine is at present being ventilated by a small direct-coupled Sheldon fan producing about 7,000 cubic feet of air a minute, and preparation is being made to install an Aloes fan, 50,000-cubic-feet capacity, driven by a 60-horse-power steam-engine, which will be operating early in January.

Conditions with regard to ventilation at this mine have been fairly good and no explosive gas has been reported. All the working-places are well timbered and plenty of timber was provided convenient for the use of the workmen. The mine is fairly free from coal-dust.

The coal is all mined by hand. The explosives used are of the permitted class and all shots are fired with electric detonators under the supervision of certified officials. The haulage is at present by hand from the foot of the chutes to the Main slope, where the coal is hoisted to the surface by a steam-hoist. From the top of the slope the cars are lowered in trips to the top of a gravity-plane, which lowers them to the tipple. This gravity-plane consists of a 3-rail track with a passing at the centre, 1,800 feet long, handling 6-car trips, each car having a capacity of 1 ton, using a 1-inch rope on a Stine wheel.

The lamps used in this mine are either Edison electric safety-lamp or the Wolf safety-lamp.

The power plant consists of two Leonard-type boilers with a joint capacity of 80 horse-power, furnishing steam for the hoists, fan-engine, and lighting plant. An auxiliary plant at the tipple consists of one small 25-horse-power boiler which furnishes steam for a small hoist at the tipple and a pump for delivering water at the mine. Another small boiler is situated near the river which furnishes steam for the pump, which delivers the water to a tank at the tipple. The other surface equipment consists of machine, carpenter, car-repairing shop, and office buildings.

The following are the official returns from the Fleming Coal Company for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	30,487			
" export to United States				
" " other countries				
Total sales		30,487		
Used in making coke				
" under colliery boilers, etc	1,635			
Total for colliery use		1,635		
Stocks on hand first of year	100			
" last of year	100			
Difference { added to / taken from } stock during year				
Output of colliery for year		32,122		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	4	6.50	2	5 50	6	
Whites—Miners	24				24	
Miners' helpers						
Labourers	6		20	4.50	26	
Mechanics and skilled labour	4		5	5.50	9	
Boys						
Japanese						
Chinese						
Indians						
Totals	38		27		65	

Name of seams or pits—Nos. 2, 3, and 5 seams.

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 2 seam was discovered several years ago and a certain amount of development-work done, but was suspended when No. 3 seam was opened up. A new slope has been sunk now almost 600 feet deep on the pitch, levels are broken away every 200 feet, and the usual room-and-pillar system developed from the levels. The entire output is now being won from the seam, which is 6½ feet thick, with a very good roof and floor. No. 3 seam was only worked for the extraction of

pillars, but in October, on it showing signs of an underground fire, it was completely shut down, and also No. 5 seam, which is connected with No. 3 seam.

Description and length of tramway, plant, etc.—The plant consists of two 40-horse-power Leonard boilers; two Beatty boilers, 12 horse-power. Hoisting-engine is an Ottumwa 60 horse-power, with other auxiliary hoists. The fan has a capacity of 30,000 cubic feet and is run by a 60-horse-power Ideal engine, providing excellent ventilation. The gravity-tramway is 1,800 feet long to the bunkers, which hold 400 tons. The coal is carefully picked and cleaned and then loaded by hand. Ninety per cent. of the output goes to the Canadian Pacific Railway and Kettle Valley Railway.

Coalmont Collieries, Ltd.

Head Office—Coalmont, B.C.

Capital, $3,000,000.

Officers.	*Address.*
W. J. Blake-Wilson, President,	Vancouver, B.C.
W. L. Parrish, Vice-President,	Winnipeg, Man.
A. H. Douglas, Secretary-Treasurer,	Vancouver, B.C.
Donald McLean, Manager,	Coalmont, B.C.

COALMONT COLLIERY.

Donald McLean, Manager; Alex. Bryden, Overman; John McMurtrie and Thomas Bysouth, Firebosses.

Coalmont is situated on the Kettle Valley Railway, 170 miles east of Vancouver and 12 miles west of Princeton, at an elevation of 2,400 feet above sea-level. Mining operations are being conducted on the south-western slope of the mountain about 5 miles from the town of Coalmont, on the north bank of Granite creek, at an elevation of about 3,600 feet and 1,600 feet above the valley of the Tulameen river at Coalmont.

This mine has been operated during the whole of the year. As the coal has been brought from the mine by auto-trucks to the railway siding at Coalmont, a distance of about 5 miles, the output of the mine has been limited to the capacity of the trucks. During the year there has been a large staff of workmen employed, chiefly in the construction of surface plant, aerial tramway, and installation of machinery and equipment for the production of coal on a large scale.

DEVELOPMENT.

The principal work done during the year has been the extending of No. 2 level on the No. 2 seam, which is about 10 feet thick, and may be classed as bituminous coal of good steaming and coking qualities. This level is at an elevation of 3,764 feet and has been driven a distance of 3,250 feet from the portal. A large amount of work has been done to this level during the year by way of straightening, renewing timber, ditching, grading, and relaying track at a 3-foot gauge with 30-lb. steel. All work has been opened to the rise of this level and the method of work is by pillar and stall. The mine is divided into panels, so that in case of fire it will be more easily controlled. The counter-level is driven about 100 feet above the level and raises 12 feet wide are driven to the full inclination of the seam, which is about 20° W. The main raise strikes the croppings at a distance of 660 feet, from which the No. 1 level has been started. The coal is conveyed from the faces by means of chutes to the mine-cars on the level, where it is taken by horse-haulage to the surface.

The mine-workings are ventilated by a fan manufactured by the American Blower Company and is capable of producing 38,000 cubic feet of air, with a 1-inch water-gauge, which is greatly assisted by the natural ventilation produced by the mine. Upon my last inspection I found 11,970 cubic feet of air a minute passing through this mine for the use of ten men and two horses. Barometer, 26 inches; thermometer, 32°; water-gauge, 0.2 inch.

During my inspections I have not been able to find any trace of explosive gas and the mine is well timbered throughout. A good supply of timber is provided for the use of the workmen,

and due to the nature of the coal the mine is very free from coal-dust. All explosives used are of the permitted class, shots being fired by electrical detonators by certified officials.

To the east of the No. 2 tunnel, a distance of 330 feet, a pair of large tunnels, 8 by 12 feet, known as the Wilson tunnels, are being developed, and at present are driven a distance of 825 feet. They are strongly timbered by sets up to 20 inches diameter. In driving these a large amount of wet ground was encountered and bridging and spilling had to be adopted; at present they are fairly dry. This tunnel is ventilated by means of 12-inch pipes connected to a force-fan driven by a small steam-engine and provides ample ventilation. Eighty feet below the No. 2 tunnel an airway has been prepared where the fan is situated and is connected with the workings of No. 2 level. Development-work is being directed, following the strike of the measures to the centre of the basin towards the Coalmont side of the mountain, to enable the mine to be opened from that side, and when that is done the transportation problem will be solved.

Plant and Equipment.

The only power used at this mine is a 20-horse-power vertical boiler generating power for driving the fan. The coal is lowered by means of a gravity-plane from the portal of No. 2 tunnel to the terminal of the aerial tramway, where the body of the car, which has a capacity of 1 ton, is lifted from the frame and automatically attached to a rail directly connected to the tramway. This tramway is about 3 miles in length and is provided with towers supporting a 1½-inch locked coil steel rope over which the buckets run, attached by means of grips to a ½-inch endless rope running at a speed of about 4 miles an hour. This tramway is provided with an auxiliary hoist which may be used in case of need, but very little power is required, seeing that the difference in the elevation of the terminals is about 1,600 feet.

At Coalmont, where the main power plant is situated, a power-house is under construction and is equipped with two water-tube boilers, fitted with induced draught, duplicate pumps, and feed-water-heating attachments; these boilers have cross-drum and horizontally inclined tubes and may be considered to be very economical for a modern steam plant. At the power-house a 600-kw. electric generator has been installed with transformers; the current is taken over high-tension wires to the mine at a voltage of 10,000 volts, where it is reduced to 550 volts for use at the mine.

The tipple, which is situated at the lower terminal of the tramway, is provided with automatic detacher and attacher, the buckets running by gravity to the dump and emptying into a chute connected to a Marcus screen which is at present provided for making three sizes of coal.

Accommodation for Employees.

At the town of Coalmont there are about twenty cottages for the accommodation of the employees and their families, also an excellent hotel; the business office is also situated here. At the mine a new mess-house 32 by 36 feet has been constructed and includes store, kitchen, and dining-room; it is comfortably furnished, well equipped, and steam-heated.

A large and commodious rooming-house to accommodate seventy-two men is under construction and will be furnished to accommodate two men in each room, single beds being provided. The rooms will be steam-heated and electric-lighted. The company will supply the furniture and bedding as a precaution to ensure cleanliness and comfort of employees. Near the entrance to the rooming-house and connected by a passage a large and commodious wash-house is being erected, electric-lighted and steam-heated, and provided with shower-baths, wash-basins, with hot and cold water; also lockers which are steam-heated and a large lavatory which includes every convenience.

Carpenter, Machine, and Blacksmith Shops.

These shops, which are situated near the mine-tracks, are being well equipped and provided with modern machinery; at present they are being used for car building and repairing. The machine and blacksmith shop is being provided with two forges, steam-hammer, large lathe, planer, pipe-threading machine, etc.

At present open lights are being used at this mine, generally carbide-lamps. The inspection of the mine is made by certified officials with locked safety-lamps of the Wolf type, and, as already stated, no trace of methane has been found in this mine. Edison electric safety-lamps are on order and will be installed as soon as received.

MINE-RESCUE APPARATUS.

The mine-rescue apparatus maintained at this mine is of the old negative type and is not in a satisfactory condition, and in case of need would be useless and not in a fit condition to be used. There is a good supply of first-aid equipment provided for immediate use.

Copies of the "Coal-mines Regulation Act," special rules, and plans are kept posted near the entrance to the mine.

The following are the official returns from the Coalmont Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	5,801			
" export to United States	2,702			
" " other countries				
Total sales		8,503		
Used in making coke,				
Used under colliery boilers, etc.	480			
Total for colliery use		480		
Stocks on hand first of year	1,000			
" last of year	1,000			
Difference { added to / taken from } stock during year				
Output of colliery for year		8,983		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	4	6.50	4	6.50	8	
Whites—Miners	22	7.50			22	
Miners' helpers	2	5.75			2	
Labourers	6	5.50	14	5.50	20	
Mechanics and skilled labour			6	6.75	6	
Boys	2				2	
Japanese						
Chinese						
Indians						
Totals	36		24		60	

Name of seams or pits—Wilson tunnel No. 3 and No. 2 tunnel.

Description of seams, tunnels, levels, shafts, etc., and number of same—Seam now being mined, average thickness 10 feet; No. 1 level driven 300 feet; No. 2 level driven 3,200 feet; No. 3 level driven 800 feet; all in same seam. Seam being mined, fourth seam under 12 feet of sandstone. Aggregation of seams immediately under seam mined averages 80 feet in thick-

ness. Total aggregation, 160 feet thick. Seam 300 feet below above aggregation 12 feet in thickness. All seams conformable.

Description and length of tramway, plant, etc.—Tram in No. 1 level, 300 feet; tram in No. 2 level, 3,400 feet; tram in No. 3 level, with yard, 1,900 feet; aerial tram, 2¼ miles. Plant at mine: One upright tubular boiler, 22 horse-power; one Jenck's tubular boiler, 42 horse-power; one 200-horse-power, 550-volt, 3-phase, 60-cycle G.E. induction-motor; one 50-horse-power, 550-volt, 3-phase, 60-cycle Canadian Westinghouse induction-motor; one 30-horse-power, 550-volt, 3-phase, 60-cycle Westinghouse motor; one compressor, 1,055 cubic feet a minute. At Coalmont: Two water-tube boilers, 250 horse-power each; one Corliss cross-compound condensing-engine, 600 horse-power; one generator, C.G.E., 3-phase, 60-cycle, 550 volts, 480 amperes, 150 r.p.m.

Princeton Coal and Land Company, Ltd.

Head Office—15 Great St. Helens, London, E.C.

Capital, $1,000,000.

Officers.	*Address.*
A. St. George Hamersley, Chairman,	London, Eng.
E. S. Neave, Secretary,	London, Eng.
Ernest Waterman, General Manager,	Princeton, B.C.
Francis Glover, Manager,	Princeton, B.C.

Value of plant, $77,000.

PRINCETON COLLIERY.

Francis Glover, Manager; William James, Overman; Robert Gourley, Ben. J. Barlow, and Thomas Leeman, Firebosses.

This colliery is situated near the right side of the Similkameen river, about half a mile from the town of Princeton, and is developed by a pair of slopes driven in a south-western direction, dipping at an angle of 14° and reaching the coal about 200 feet from the portal.

The coal-seam averages about 20 feet in thickness, dipping to the south at an angle of 12° to 14°. The work until the present year was chiefly confined to the upper 10 feet of the seam, while during the present year a large portion of the output has been extracted from the lower part of the seam.

Mining of the coal during the development stage is done by machines of the post-puncher type, driven by compressed air, but when retreating the coal is easily extracted without the machine, the method of work being the pillar-and-stall system; during the year the work has chiefly consisted in the extraction of pillars. The only development-work done during the present year may be said to consist of a pair of diagonal slopes which are being driven to the west of the Main slopes at a distance of 750 feet from the portal of the Main slope. It is the intention to drive these below the present workings and open the mine up by the pillar-and-stall method, leaving a panel of coal between each section so that in case of fire it will easily be dealt with.

Ventilation is produced by a small fan of the Guibal type, driven by a small steam-engine, and at my last inspection was producing 21,000 cubic feet of air a minute for the use of ten men, running at a speed of 200 revolutions a minute, with a 0.5-inch water-gauge. Barometer, 27.75 inches; thermometer, 32° F.

The method of haulage in the mine is by means of small compressed-air hoists, while the cars are hoisted to the surface by means of a steam-hoist situated near the tipple.

Fortunately, during the present year there have been no new outbursts of fire in this mine and a considerable amount of fluming has been done with sand and water near the entrance to the fire areas, and permanent stoppings have been built which seem to be very effective in sealing off these sections of the mine.

During my inspections I have always found this mine to be very free from explosive gas. On several occasions I have found a little black-damp at the foot of stoppings near the fire areas, which generally indicates a leakage in the wall, and is remedied as soon as the defect is repaired.

The roads I have generally found to be in a fairly good condition and free from coal-dust. The working-places are well timbered, as required by the special rules, and a sufficient supply of suitable timber is provided for the workmen. Blasting is carried out at this mine under the supervision of competent persons, as provided for by the "Coal-mines Regulation Act." All lamps in use are the Edison electric mine safety-lamp for the workmen, while safety-lamps of the Wolf type are used by the officials for inspection purposes.

The surface equipment consists of a modern screening plant capable of handling about 600 tons of coal in eight hours. The mine-cars, which have a capacity of about 1.5 tons, are hauled up the Main slope in 5-car trips by a steam-hoist situated near the tipple. The cars are dumped by a rotary tipple-dump upon a reciprocating feeder which regulates the coal, which then goes to a jigging-screen, where the coal is cleaned and made into different sizes or grades, the various grades being taken to different bunkers by belt-conveyors having a joint capacity of about 400 tons. The tipple machinery is driven by a 50-horse-power steam-engine, while the loader and conveyor are driven by a separate engine.

The power plant consists of three return-tubular boilers with a combined capacity of 200 horse-power; a Canadian Rand compressor with a capacity of 750 cubic feet of free air a minute providing air for the mining-machines, hoists, and pumps; a 60-kw. 3-phase alternator, driven by a Goldie-McCulloch steam-engine, supplying light for the mine and the town of Princeton. During the latter part of the year this electric-light plant has not been in operation, as this company is at present taking power from the Kootenay Power and Light Company, having connected its lines with the power-lines of the above company at Allenby.

Well-equipped machine-shop, car-repairing and carpenter shop, wash-house, and lamp-room are maintained, and a 30,000-gallon water-tank is provided for fire-protection and other purposes.

Unfortunately, on December 23rd a destructive fire broke out and destroyed the tipple, link-belt screens, bunkers, and rotary dump; this is at present being replaced by a temporary tipple, bar screens, and rotary dump which are expected to be in operation about the middle of January.

Copies of the "Coal-mines Regulation Act," special rules, "systematic timbering" orders, and plan of the mine are kept posted near the entrance to the mine.

The following are the official returns from the Princeton Colliery for the year ending December 31st, 1920:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	15,616			
" export to United States	1,461			
" " other countries				
Total sales		17,080		
Used in making coke				
" under colliery boilers, etc	3,836			
Total for colliery use		3,836		
		20,196		
Stocks on hand first of year	232			
" last of year	33			
Difference taken from stock during year		199		
Output of colliery for year		20,717		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
				$		
Supervision and clerical assistance	4		5	5.50	9	
Whites—Miners	14	$6–$10			14	
Miners' helpers	5	5.25			5	$5.25
General underground men	15	$5–$5.25	7	4.85	22	$4.85–5.25
Mechanics and skilled labour			7	5.80	7	5.80
Boys			2	$2–$3	2	
Japanese						
Chinese						
Indians						
Totals	38		21		59	

Name of seams or pits—Same as last year.

Description of seams, tunnels, levels, shafts, etc., and number of same—Same as last year, with the exception that new slopes have been started off in a westerly direction from a point approximately 750 feet down the present Main slope.

Description and length of tramway, plant, etc.—Approximately same as last year. On December 23rd a disastrous fire destroyed the tipple, link-belt screens, bunkers, and rotary dump. This has been replaced with a temporary tipple, bar screens, and Robinson rotary dump, and picking-tables will be installed as soon as possible. The electric-light plant is not now operating, as the company is taking power from the West Kootenay Power Company, having linked up with their line at Allenby. The origin of the surface fire was reported by the Chief Government Fire Inspector to be spontaneous combustion.

Chu Chua Mine Syndicate.

Officers.	*Address.*
W. H. Glass, Trustee,	Seattle, Wash.
H. W. Schuett, Trustee,	Seattle, Wash.
David Brown, Superintendent,	Chu Chua, B.C.

CHU CHUA COLLIERY.

David Brown, Manager; John Sullivan, Fireboss.

This mine is situated east of the North Thompson river, 55 miles north of Kamloops and about 1 mile from the Canadian National Railway. It may be described as comprising the whole of the foot-hills and flats from the Newhykulston creek to the Chu Chua depot, a distance of nearly 3 miles.

There are three small seams outcropping on the side of the hill, the upper one of which is at present being developed. The workings consist of a level and counter driven on the strike of the seam a distance of about 200 feet and connected by crosscuts. The measures are dipping north-east at an angle of about 20°, and upon my last inspection slopes were being started off the Main level to prove the measures to the dip.

All the coal is mined by compressed-air machines of the post-puncher type. This seam being overlain by sandstone, it is the intention to develop this mine by the long-wall system. The coal is brought out of the level by hand and dumped into a 2-chamber bunker provided with screening-bars having a capacity of about 100 tons; from the bunker the coal is transported by teams to a railroad spur a distance of 1 mile.

The mine is at present being ventilated by a small Sirocco fan, driven by a small compressed air-engine, which produces ample ventilation.

SURFACE PLANT.

The surface plant consists of one locomotive-type steam-boiler of 44 horse-power, which is used for driving a 10 by 10 single-stage compressor for running the fan and mining-machines. A cook-house and several small one-room cottages are provided for the employees; also office, blacksmith-shop, and stables.

During my inspections I have found no trace of explosive gas and the mine is very well timbered. Plenty of timber is provided for use by the workmen.

This mine is at present using open lights, generally carbide-lamps, Wolf lamps being used for testing.

The coal is of a firm nature and is blasted with a permitted explosive, all shots being fired with electric detonators under the supervision of a certified shotlighter. The mine is very free from coal-dust.

This mine is well provided with first-aid appliances and copies of the "Coal-mines Regulation Act" are posted near the entrance of the mine.

The following are the official returns from the Chu Chua Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	232			
" export to United States				
" " other countries				
Total sales		232		
Used in making coke				
Used under colliery boilers, etc.	75			
Total for colliery use		75		
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } Stock during the year				
Output of colliery for year		307		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	2	9.00			2	
Whites—Miners	7	7.00			7	
Miners' helpers	2	5.50			2	
Labourers			2	4.50	2	
Mechanics and skilled labour			2	6.00	2	
Boys						
Japanese			1	4.00	1	
Chinese						
Indians						
Totals	11		5		16	

Name of seams or pits—No. 1 seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—An adit level which starts from outcrop on Newhykulston creek is in a distance of 225 feet on the strike of the seam, running N. 5° E., and a counter-level in a distance of 200 feet crosscuts on 60-foot centres; seam pitching 25°. Coal-seam, 3 feet thick, with 3 inches of rock in the centre and a sandstone roof. Good domestic and steam coal.

Description and length of tramway, plant, etc.—Coal is dumped into bunkers of 80-tons capacity at the opening of adit level, and then hauled by teams a distance of half a mile to siding on Canadian National Railway for shipment to Kamloops. A tramway will be built during 1921. Plant consists of one 44-horse-power boiler, locomotive type; one compressor, capacity 270 cubic feet of free air a minute; one steam-electric plant for lighting and power to drive fan, with a total capacity of 75 kw.

EAST KOOTENAY INSPECTION DISTRICT.

Report of Robert Strachan, Senior Inspector.

I have the honour to submit the annual report covering the operation of all coal and metalliferous mines in the Kootenay-Boundary District during the year ending 1920.

This district is subdivided into two portions for the purpose of inspection—namely, the East Kootenay and the West Kootenay and Boundary Inspection Districts.

The East Kootenay District was in the early part of the year under charge of William Lancaster, who was unfortunately killed in an auto accident while proceeding from his office in Fernie to Coal Creek mines about the end of May. In August John McDonald, of Middlesboro, was appointed to succeed Mr. Lancaster. The West Kootenay and Boundary District has been under the charge of H. H. Johnstone, with office in Nelson, during the entire year.

Through the unfortunate accident to Wm. Lancaster the Department of Mines lost a very valuable servant, while I personally lost a colleague who through his general knowledge of mining and his very intimate knowledge of the many intricate problems relating to this district was of invaluable assistance in carrying out the many duties which devolve on the Inspectors.

East Kootenay District Coal-mines.

No new collieries were opened during the year, nor was any attempt made to reopen either the Carbonado Colliery at Morrissey, owned by the Crow's Nest Pass Coal Company, Limited, or the Hosmer mines at Hosmer, belonging to the Canadian Pacific Railway, Natural Resources Department, which mines have been idle for some years. The collieries operated were Coal Creek and Michel, owned by the Crow's Nest Pass Coal Company, Limited, of Toronto, and Corbin, owned by the Corbin Coal and Coke Company, Limited, Spokane, Washington, U.S.A.

The colliery at Coal Creek consists of seven mines, all of which were in operation during the year; that at Michel consists of three mines, all of which worked during the year; while at Corbin the No. 4 mine worked during the whole year, but the No. 3 mine (open-cut) was stopped, both in the beginning and at the end of the year, owing to trouble with the heavy snowfall, which made it difficult to operate the steam-shovel by which the coal is extracted and loaded. The Nos. 5 and 6 mines at Corbin, which are in the prospecting stage, were worked in a small way during the entire year with very promising results.

In the early part of the year there was a slight shortage of labour, while at the latter end the supply was greater than the demand; the closing of sawmills and logging camps and the end of the harvest season probably accounting for the influx.

With the exception of a few days' stoppage in March and two weeks' stoppage in October, the mines worked fairly steadily throughout the year. The first stoppage was incidental to the conclusion of an agreement between the employees, as represented by the United Mine Workers of America, and the employers, represented by the Western Coal Operators' Association, and the stoppage in October was over some further adjustment of the wages paid to day-men in and around the mines.

The agreement entered into between the United Mine Workers of America and the Western Coal Operators' Association covers the period of two years from April 1st, 1920, to March 31st, 1922, and covers all the mines in Alberta and Eastern British Columbia.

Attached to this report is a short list of the wages paid to the workmen in and around the mines, taken from the agreement on the basis of an eight-hour day.

The amount of time lost during the year amounted to about fifty-six days; this represents quite a large sum when we take into account the number of workmen employed. If we take the average wage at $5 a day, which is pretty low, the amount of money lost through this stoppage of work will amount to $442,960.

Consideration should be given to the fact that no proper provision is made for granting annual vacations in mining to the workmen, and I think that if some study was given to this subject it would tend to stabilize the trade and create a better feeling between the employees and employer.

The following table shows the output of coal in long tons as reported to this office, the amount of increase over the previous year, and the number of days worked:—

Colliery.	Output of Coal.	Increase over 1919.	Days Worked.
	Tons.	Per Cent.	
Coal Creek	431,783	41	279
Michel	264,592	53	281
Corbin	151,014	89	291
Totals	847,389	55	...

The amount of coke produced during the year was 67,792 tons, showing an increase of almost 18 per cent. All the coke was produced from the ovens at Michel, of which only about 50 per cent. are in operation, while those at Fernie have not been in use since April, 1919.

The following table shows the output of coal for each underground employee and each miner for the year and daily during the past three years:—

Colliery.	1918. Underground Employees.		1919. Underground Employees.		1920. Underground Employees.	
	Per Year.	Per Day.	Per Year.	Per Day.	Per Year.	Per Day.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Coal Creek	816	3.3	497	2.48	408	2.4
Michel	791	3.0	542	2.64	782	2.7
Corbin	2,066	7.3	1,225	6.90	1,987	6.8

Colliery.	1918. Miners only.		1919. Miners only.		1920. Miners only.	
	Per Year.	Per Day.	Per Year.	Per Day.	Per Year.	Per Day.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Coal Creek	1,742	7.0	972	4.86	1,277	4.6
Michel	1,638	6.0	993	4.80	1,310	4.6
Corbin	3,647	12.8	2,658	15.10	2,157	7.4

The figures of output per man per day in Corbin are high and reflects the system of mining, which is by steam-shovel at the open-cut and in the mine by allowing the pillars to cave.

Accidents.

Thirteen accidents were reported during the year, involving death or serious disability to fourteen workmen. There were three fatalities among the accidents reported and eleven persons seriously injured.

Two of the accidents with fatal results occurred in Coal Creek Colliery—one in No. 1 East mine and the other in No. 1 North mine. One accident with fatal results occurred at Michel in the No. 3 East mine.

Causes of the accidents were as follows:—

Colliery.	Falls of Coal at Face.	Falls of Rock at Face.	Haulage.	Timbering.
Coal Creek	1*	1*	3	..
Michel	2	1*	4	..
Corbin	..	..	..	2

* Fatal.

Of the above, six occurred at the working-face and include the three which ended fatally, six on the roadways, and two outside the mine.

The accidents according to occupation are as follows: Fireboss, 1; miners, 4; miner's helper, 1; trackman, 1; drivers, 3; motorman, 1; trapper, 1; tipple-boy, 1; carpenter, 1; total, 14.

The rate per thousand of fatal accidents is 1.89, and as compared with the previous year reflects a considerable increase.

In the fatal class there was an increase from one to three and in the serious class an increase from six to eleven; and while we have to admit that the mines during 1920 were in operation about two months more than in 1919 the figures would almost seem to indicate a relaxing of the discipline around the mines, and especially at the working-faces.

Coroners' inquests were held in the case of all fatal accidents. At these the Department was represented by the Inspector of Mines, and through the courtesy of the Coroner he was allowed to examine any witnesses whom they thought could throw any light on the cause of the accident; reports on these accidents were made immediately following the inquest.

The first fatal accident, which occurred to Frank Disgusto in the No. 1 East mine at Coal Creek Colliery on February 26th, occurred through the lack of a proper sprag at the working-face. The deceased, who was working as a helper to two certificated miners, was allowed to go in and shovel some loose rock under an overhanging piece of top coal to which a post had been put, but which required a sprag or stay; the result was that the coal fell outwards, fatally injuring the deceased.

The second occurred to Matthew Turnbull, fireboss in No. 1 North mine, Coal Creek Colliery, on March 15th, and in this case the deceased, who was on duty, recklessly and despite the protests of the miners in the place, who had been instructed by the overman how to proceed with the work, commenced to withdraw timbers without using a timber-drawing machine, as required by Special Rule 115 (*f*), with the result that the place caved, burying him.

The third fatal accident occurred to Louis Nagy in No. 3 East mine, Michel Colliery, on April 17th. The deceased was engaged taking a slice off a pillar; some coal had been extracted from the loose end without any timber being placed, and, according to the evidence of his working partner, the deceased was barring down a piece of loose roof rock; when this piece of rock was about to fall he ran under it notwithstanding that it was impossible to get out that way, instead of retreating to the safety of the working-place, where the roof was secured by timber.

The other two serious accidents at the working-face were likewise due to lack of sufficient spragging.

Two of the haulage accidents were due to trips of cars smashing through doors set up to control the ventilation, and would suggest that some means of opening doors should be provided that would not require the person in charge to have to go out on the haulage-road for this purpose, more especially where boys have more than one door to attend.

The other accidents inside the mine consist of a motor attendant falling off the motor, drivers thereby getting their legs injured between the car and a door or the car and the shafts of the horse.

The two accidents outside the mine consisted of one at Coal Creek, on the tipple, where a boy engaged in carrying checks to the weighman was run down by a trip of loaded cars pushed

ahead of the compressed-air locomotive, and would seem to indicate the necessity for a more frequent use of some method of warning, more especially when the trips are being pushed ahead of the locomotive. The other accident outside the mine occurred to a carpenter who fell off a scaffold while repairing a snow-shed.

When we consider the large percentage of accidents from falls of coal and roof at the working-face, some method of impressing on the workmen the necessity of setting sufficient supports to the roof and sides becomes apparent.

VENTILATION.

The general condition of the mines with respect to ventilation is fairly well treated in the detailed report made by Inspector McDonald and attached, although in some cases I think greater advantage of splitting the air-current, and more care could be taken in regard to conducting the air-current into rise places and holes in the roof, in order to prevent the accumulating of bodies of inflammable gas in such places.

For the purpose of determining the conditions of the air-currents with respect to methane and other gases, advantage was taken of the opportunities offered by the Dominion Department of Mines for analysing air samples, for which we are very much indebted. Three hundred and seventy-nine samples, of which thirty-two were lost either in transit or otherwise, were secured and sent for analysis. Of these, 206 were taken in Coal Creek, 169 in Michel, and four in Corbin. In addition, the Burrell gas detector was used to great advantage in determining the percentage of methane in the various splits and main return airways.

I am attaching tables showing the average percentage of methane, as well as the average percentage of mine-air measured in cubic feet a minute; also a comparison with the two preceding years and the amount in cubic feet of methane given off to the ton of coal mined.

An increase will be noted in some cases, and in others a decrease; the increase is not surprising when we consider that the mines are penetrating farther into the mountains, leaving greater areas of exposed surface.

In the case of the West split in No. 1 East mine, Coal Creek, this increase amounts to almost double what it formerly showed, but it must be taken into account that this district is only being reopened after the serious disturbance in 1916, when the "bump" created havoc.

In the No. 3 East mine, Michel Colliery, a very decided increase is noted in the West split, where the average percentage has risen from 1.61 to 1.74. In this case the increase seems to be due more to the area of ground exposed and roof conditions than to the actual mining of coal.

A rather interesting feature in this mine was noted during the time the mine was idle in October. A sample of the air in this (West) split was taken eight days after work was discontinued and showed 1.99 per cent. of methane. Another sample taken at the same place and under similar conditions, except that the mine had been working for twelve days, showed 1.39 per cent. of methane, which would seem to indicate that the methane is given off more from the areas exposed and roof conditions than due to actual mining of coal. In this particular district I might say that the work consists mostly of the extraction of pillars.

Similar samples were taken in No. 1 East mine, Coal Creek, but, owing to the speed of the fan having been reduced to about half the normal, could not be used for comparison.

Another interesting feature, which I think could be investigated to advantage, is the report of the analyst made in in regard to the samples from No. 3 East mine, Michel Colliery, which states: "In every sample of mine-air from this mine traces of free hydrogen are found, which, although negligible unless in the case of high percentage of methane, might increase the danger by rendering the gas more easy to explode."

No new ventilating apparatus has been installed during the year at any of the mines, although at least two fans have been on the ground at Coal Creek since 1917.

COAL-DUST.

During our inspections we have had occasion, all too frequently, to impress on the management the necessity of dealing effectively with this danger.

Methods of sprinkling the roadways and the working-faces are installed in nearly all the mines which are not naturally damp or free from dust, but too often these are given a secondary consideration. Flue-dust barriers are erected and then forgotten, and unfortunately in most cases these are built in such a manner as really to be of very little service should the occasion arise for arresting or stopping the flame of an explosion.

I feel that no effort should be spared to maintain these mines free from dust, and in cases where water is not available non-combustible dust should be used liberally, not simply thrown on the roads and sides, but distributed all over by machines as are now available for this purpose.

One feature which is very hard to overcome is that, while officials are willing to admit the dangers from coal-dust, they never seem willing to admit danger from the dust in their particular mine. The only means that can be taken to overcome this would be to have some method of sampling the dust at regular intervals, and the resultant analysis to be posted at the mine entrance.

Bumps and Blow-outs.

No fatal or serious accidents have been reported from this source during the year, although in the latter part minor bumps have been reported rather frequently in the No. 1 East mine, Coal Creek. These have mostly occurred in the West district or tunnel, where the bumps were experienced in 1916, and so far the disturbances have been limited to destroying about 100 feet of roadways in each case.

In several cases bumps have been felt outside the mine, alarming the residents of the village at Coal Creek, but inspection of the mine has failed to reveal any serious damage. The bumps which have occurred fortunately took place when the workmen were absent, or we might have to record a longer accident list.

The nature of the disturbance seemed to follow the regular course, the floor being thrown upwards and the sides of the pillars being squeezed out into the open space, in some cases completely blocking the roadways. Timbers are thrown out with considerable violence and in some cases cogs built to secure the roof have followed a like course.

I should like to see some investigation to clear up the matter of these "bumps," and I feel that the sooner we dismiss all obscure or illusive theories as to their cause, and recognize the fact that the weight of the overhead strata is the determining factor, we will be on the road to find the remedy. This may be aggravated by weaknesses in the strata, but we must remember that the present workings are under 2,435 feet of strata representing a weight of 187 tons per square foot under normal conditions; and the conditions at this mine are far from normal, the mountains being open on the north, while deep gashes cut up each side, leaving them, as has been described by the Provincial Mineralogist, "almost like a lever supported at one end."

A few bumps were reported in the No. 3 mine, Coal Creek, in the early part of the year; these were in the proximity of a fault which may have contributed to the result, but as this seam is directly under the No. 1 East mine and separated only by about 150 feet of strata, no doubt exists but that the same conditions apply as in the No. 1 East mine, and whenever the seam is weakened by the extraction of a certain percentage of coal we have a bump. Considerable gas was given off, especially in the No. 3 mine, and can be accounted for by the pillars being thrust into the floor, which is composed of rock and coal.

In one case a miner was imprisoned for a short time, but I am glad to record that he used very good judgment and remained in the safety of his working-place, and when the disturbance subsided he managed to get out. In this case I think the use of the Edison electric lamp was a very important factor; if he had carried a safety-lamp, in all probability it would have been extinguished, or if damaged would have been a danger in the gas, whereas with the electric lamp he still had a light and was able to extract himself later.

Outbursts of gas, generally termed "blow-outs," have occurred quite a number of times in the No. 1 East mine, Coal Creek, the largest of which took place in the month of May, dislodging between 200 to 800 tons of coal and rock. These come generally from the overhead strata, which consists of about 3 feet of rash (shale) and 3 feet of roof coal which is timbered up, and lies between the main rock roof of the seam and the coal extracted. This rash is very soft and friable and when allowed to come down is almost impossible to separate from the coal, which is the reason for leaving these strata.

In determining the amount of coal and other material dislodged by the blow-outs, all this top rash and coal comes down owing to the timbers being blown out, making it very hard to estimate what is thrown out by the outburst and what is brought down by the disturbance of the timbers. The amount of gas (methane) given off is also very hard to estimate, but the amount of coal, etc., dislodged, and the fact that the blower continues to blow for hours, can give some idea that the quantity is enormous.

The method of drilling to prevent these outbursts has been fairly successful in the places to which it was applied, but these were only the development places, and the majority of outbursts which occurred during the year were in crosscuts or places which do not ordinarily come in this category. Under such conditions it is needless to point out the necessity for well-kept airways of large areas and powerful fans with ample margins of capacity to cope with these abnormal conditions.

INSPECTION ON BEHALF OF THE WORKMEN.

The inspection as provided for by section 91, Rule 37, has been carried out regularly at all the mines, and no occasion has arisen when a report was required to be sent to this office. This inspection is a great help to us in maintaining safer conditions, and we are very much indebted to the workmen for doing so.

PROSECUTIONS.

Fifteen prosecutions have been made during the year, eight of which were due to workmen having matches in their possession contrary to section 91, Rule 9; four for failing to sprag the undermined coal, Special Rule 115; one owing to the workman having exposed himself to unnecessary danger, Special Rule 112; and two for fighting in the mine contrary to Special Rule 110. Of these prosecutions, eight were for offences in Coal Creek, one in Michel, and two at Corbin.

The punishments inflicted were: Five were fined $10 and six were fined $5, two were allowed to go on suspended sentence, one fled the country, and one case was dismissed.

The sentences in none of the cases erred on the side of severity, and especially in the case of persons having matches in their possession, when we consider the danger to which the workmen are exposed in mines with such great percentages of explosive gas, a penalty of $5, and in one case that of being dismissed on suspended sentence, are altogether too lenient.

A list showing the names, mines, and offences committed, with the sentence imposed, is attached to this report.

HAULAGE.

The haulage in the large majority of the mines is either by ropes or compressed air, and the only place where electricity is used underground is at Corbin, where a drill is run in a rock tunnel by this power.

The cars are brought to the partings from the working-faces by horses, and the following table shows the number of the latter employed:—

Colliery.	Inside Mine.	Outside Mine.	Total.	Died from Injuries.	Died.
Coal Creek	109	10	119	5	8
Michel	32	8	40	4	1
Corbin	9	6	15	2	..
Total	150	24	174	11	9

All the horses are brought out to the stables, which are situated convenient to the mines, and are very well cared for.

LIGHTING.

All the miners at Coal Creek and Michel and about 50 per cent. of those working underground at Corbin use the electric head-lamp of the Edison mine safety type, and the only other light permitted underground is the Wolf safety-lamp. The latter is used by the bratticeman and officials for inspection purposes, while the Burrell gas-detector is used for determining lower percentages of gas than can ordinarily be detected in the mine-air with the Wolf safety-lamp, as required by section 91, Rule 4, of the "Coal-mines Regulation Act."

The returns show 1,096 electric lamps in use and 120 Wolf safety mine-lamps, all of which are cleaned, repaired, and inspected before being issued to the workmen, in substantial lamp-rooms convenient to the mines.

EXPLOSIVES.

The total explosives used in the coal-mines of the Crowsnest pass was 22,729 lb., or 11,364 tons (2,000 lb.). The following table shows how they were used:—

Colliery.	Explosive.	Quantity.	Shots fired.	Amount per Shot.	Work used for
		lb.		lb.	
Coal Creek	Permetite	1,130	1,548	0.73	Rock-work.
Michel	"	646	687	0.94	"
"	Monobel	12,578	18,023	0.70	Coal.
Corbin	Permetite	2,762	2,620	1.00	Rock-work.
"	Monobel	2,513	2,472	1.00	Coal.
"	Stumping powder	3,100	126	24.60	"

NOTE.—The stumping-powder used at Corbin was in the open-cut, frequently to shoot off the cover and sometimes to loosen up the coal for the steam-shovel.

No explosives were used in breaking down coal at Coal Creek mines; in Michel the amount of coal produced per pound of explosive was about 20 tons and at Corbin 28.7 tons.

COAL-CUTTING MACHINES.

Owing to the friable nature of the coal very few machines are used and the amount of coal produced by these amounts to 11,819 long tons. One machine of the post type produced 245 tons at Coal Creek and four at Michel produced 11,574 tons.

At Corbin the steam-shovel is used at the No. 3 mine or open-cut for both digging and loading the coal, but it is not generally termed a coal-cutting machine.

MINE-RESCUE AND FIRST AID TO THE INJURED.

The work of mine-rescue training has made very little progress at Coal Creek mines, as only five workmen took some training; all of these previously held certificates. At Michel, thanks to the grant given by the Hon. the Minister of Mines, which allowed us to appoint a temporary instructor there, nine workmen took a course in this work.

The following shows the proportion of men trained in mine-rescue work compared with the number employed underground:—

Colliery.	No. employed Underground.	No. holding Mine-rescue Certificates.	Ratio.
Coal Creek	648	35	1:18
Michel	338	18	1:18
Corbin	76	6	1:12.6

The amount of mine-rescue apparatus maintained at the collieries is similar to that reported for the past few years, all consisting of the Draeger type. The following is a list of types, with amount of oxygen on hand:—

Colliery.	Draeger Positive, 2-hour.	Draeger Negative, 2-hour.	Draeger, ½-hour.	Oxygen.
				Cu. Ft.
Coal Creek	5	..	5	700
Michel	5	..	5	100
Corbin	..	2	1	300

In addition to the above, there are at the Government station at Fernie six Gibbs and four 2-hour positive-type Draegers. In addition, there is one Paul which has been loaned from the Nanaimo station for testing purposes. There is also maintained on hand here 1,800 cubic feet of oxygen and 690 regenerators for the Draegers and ninety-eight regenerators for the Gibbs. The Gibbs apparatus is not fitted with a by-pass, and in the present condition of affairs it

would be a great advantage to all concerned if we could arrive at some standard for mine-rescue apparatus.

I think it is due to the coal companies, which have to purchase apparatus, that we could assure them a fair life for apparatus, and I should like to suggest that before coming to a conclusion on this point the new Briggs apparatus, the results of the investigation of the Research Committee of the British Coal Commission, should be inquired into.

When we consider the amount of time spent on investigation, the facilities for the same, and the eminence in mining affairs of the committee, I feel that we cannot dismiss this apparatus, practically the result of all their work, without due consideration.

The work of first aid to the injured has been carried out very well during the year; a class of twenty-two was in training in this work at Michel at the end of the year, while classes are being started at Corbin and Coal Creek, and in Fernie a class of forty-two started the other day. The following table shows the number trained, the number of employees and the ratio of first-aid men to total employees.

Colliery.	No. holding First-aid Certificates.	No. of Employees.	Ratio.
Coal Creek	65	847	1:13
Michel	30	581	1:19
Corbin	17	152	1:9

Of the above, ten in Corbin and nineteen in Michel took certificates in mine-rescue work during the year.

Thanks to the financial assistance granted by the Vancouver Island Mine Safety Association and W. R. Wilson, president and general manager of the Crow's Nest Pass Coal Company, two teams, one from Michel and the other from Fernie, were able to attend the mine-rescue and first-aid meet at Ladysmith on Labour Day, which materially assists in maintaining the interest in this work.

Thirteen examinations held for the purpose of granting coal-miner's certificates of competency were attended, in addition to the examinations for coal-mine officials. One hundred and thirty-five applications were considered for provisional certificates of competency as coal-miners, of which eighty-four were granted, as provided for in section 9 of the "Coal-mines Regulation Act Amending Act, 1919."

In conclusion, we wish to thank the workmen and the officials of the various mines for their hearty assistance in carrying out our duties during the year, and trust for a continuation of the same in 1921, realizing that it is only through an earnest endeavour to co-operate that we can make any attempt to make conditions safer and pleasanter in what is admittedly a dangerous occupation.

Attached is a list of the accidents reported during the year, prosecutions, tables showing the percentages of methane, etc., also a brief description of the various coal-mines by John McDonald, Inspector of Mines for the East Kootenay District, accompanied by the returns from the various collieries.

LIST OF WAGES PAID AS PER THE AGREEMENT BETWEEN THE WESTERN COAL OPERATORS' ASSOCIATION AND DISTRICT 18, UNITED MINE WORKERS OF AMERICA, INCLUDING THE INCREASE EFFECTIVE OCTOBER 25TH, 1920.

(Agreement from April 1st, 1920, to March 31st, 1922.)

Inside Wages.	Per Day of Eight Hours.
Shotlighter	$7 50
Bratticeman	7 50
Bratticeman's helper	6 89
Timberman	7 50
Timberman's helper	6 89
Tracklayer	7 50
Tracklayer's helper	6 89
Motorman	7 21
Motorman's helper	6 89

Inside Wages—Continued.	Per Day of Eight Hours.
Locomotive engineer	7 21
Locomotive switchman	6 89
Driver	7 21
Driver (spike team)	7 73
Coupler (man)	6 89
Coupler (boy)	4 40
Switch-boy	$4 03 to 4 40
Main- and tail-rope riders	7 50
Pusher	6 89
Loader	6 89
Miner	7 50
Rock-miner	8 02
Pumpman	6 89
Outside Wages.	
Teamster	$7 08
Blacksmith	8 14
Blacksmith's helper	7 09
Carpenter	8 14
Carpenter's helper	7 09
Fanman	6 58
Tipple engineer	7 61
Fireman (boiler)	7 08
Car-repairer	7 61
Car-repairer's helper	7 09
Lampman	$6 58 to 7 08
Machinist	$7 61 to 8 14
Machinist's helper	7 09
Stableman	6 58
All other labour not classified	6 58

Average Percentage of Methane in the Air-currents of the Coal-mines in the Crowsnest Pass District for 1918, 1919, and 1920.

Colliery.	Mine.	District.	1918.	1919.	1920.
Coal Creek	No. 1 East	Main return	1.30	1.07	1.50
"	"	First East split	2.00	1.63	1.66
"	"	Second East split	....	....	1.37
"	"	North split	1.38	1.08	0.66
"	"	West split	....	0.43	0.96
"	No. 1 South.	Main return	1.71	1.34	1.14
"	No. 3	"	0.90	1.23	1.17
"	"	South level	....	1.31	1.12
"	"	Incline split	....	1.42	1.38
"	No. 2	Main return	0.70	0.70	0.73
"	"	Rock Tunnel split	....	0.72	0.81
"	"	High Line split	....	0.48	0.63
"	No. B North	Main return	1.20	0.90	1.06
"	"	Slope split	....	1.06	1.08
"	"	Incline split	....	1.14	1.40
"	No. 1 North	Main return	0.50	0.44	0.37
"	No. 9	"	....	....	0.59
Michel	No. 3 East	"	1.10	1.20	1.44
"	"	No. 6 East split	0.70	1.04	0.95
"	"	West split	1.66	1.61	1.74
"	No. 3	Main return	0.69	0.71	0.78
"	"	East split	....	0.60	0.83
"	"	West split	....	0.44	0.76
"	No. 8	Main return	0.10	0.11	0.19
Corbin	No. 4	"	0.33	0.28	0.09

AVERAGE PERCENTAGE OF METHANE IN THE AIR-CURRENTS, ALSO THE AVERAGE AMOUNT OF VENTILATION IN CUBIC FEET A MINUTE IN THE MAIN RETURNS AND SPLITS OF THE MINES IN THE CROWSNEST PASS DISTRICT DURING 1920.

Colliery.	Mine.	District.	Ventilation in Cu. Ft. a Minute.	Percentage of Methane.
Coal Creek	No. 1 East	Main return	114,725	1.50
"	"	First South split	34,200	1.66
"	"	Second South split	18,127	1.37
"	"	North split	22,170	0.66
"	"	West split	17,122	0.96
"	No. 3	Main return	51,520	1.17
"	"	Incline split	23,075	1.12
"	"	South level split	18,623	1.38
"	No. B. North	Main return	40,000	1.06
"	"	Slope split	11,740	1.08
"	"	Incline split	13,510	1.40
"	No. 1 South	Main return	41,000	1.14
"	No. 1 North	"	19,060	0.37
"	No. 2	"	32,875	0.73
"	"	Rock Tunnel split	14,475	0.81
"	"	High Line split	8,220	0.63
"	No. 9	Main return	9,570	0.59
Michel	No. 3 East	"	88,230	1.44
"	"	No. 6 East split	27,270	0.95
"	"	West split	39,920	1.74
"	No. 3	Main return	54,000	0.78
"	"	East split	27,000	0.83
"	"	West split	32,000	0.76
"	No. 8	Main return	34,730	0.19
Corbin	No. 4	"	28,500	0.09

AMOUNT IN CUBIC FEET OF METHANE GIVEN OFF PER TON OF COAL MINED IN THE CROWSNEST PASS DISTRICT DURING 1918, 1919, AND 1920.

Colliery.	Mine.	1918.	1919.	1920.
Coal Creek	No. 1 East	5.389	4.925	6.192
"	No. 3	3.010	2.544	2.697
"	No. 1 South	1.917	1.796	1.867
"	No. 1. North	0.585	0.550	0.384
"	No. 2	1.716	1.491	1.360
"	No. B North	2.326	2.720	3.082
Michel	No. 8	0.145	0.130	0.211
"	No. 3 East	3.142	4.800	6.096
"	No. 3	5.186	2.253	1.732
Corbin	No. 4	0.360	0.245	0.136

AMOUNT OF METHANE GIVEN OFF IN THE TWENTY-FOUR HOURS IN THE MINES OF THE CROWSNEST PASS DISTRICT.

Colliery.	Mine.	Methane in Cu. Ft.
Coal Creek	No. 1 East	2,476,800
"	No. 3	868,320
"	No. 1 South	672,480
"	No. 1 North	102,240
"	No. 2	345,600
"	No. B North	610,560
"	No. 9	82,080
Michel	No. 8	95,040
"	No. 3 East	1,828,800
"	No. 3.	606,240
Corbin	No. 4.	37,440
Total		7,725,600

Crow's Nest Pass Coal Company, Ltd.

Capital, $3,500,000.

Officers.	*Address.*
W. R. Wilson, President,	Fernie, B.C.
E. C. Whitney, Vice-President,	Ottawa, Ont.
R. M. Young, Secretary,	Fernie, B.C.
A. Klauer, Treasurer,	Fernie, B.C.
W. R. Wilson, General Manager,	Fernie, B.C.
Bernard Caufield, Colliery Manager, Coal Creek Collieries,	Fernie, B.C.
Thomas H. Williams, Colliery Manager, Michel Collieries,	Michel, B.C.

The above company is now operating the following extensive collieries on the western slope of the Rocky mountains in the East Kootenay District, namely:—

Coal Creek Colliery, situated on Coal creek, about 5 miles from the town of Fernie, on a branch railway to the mines, connected at Fernie with the tracks of the Canadian Pacific Railway and also those of the Great Northern Railway.

Carbonado Colliery, situated on Morrissey creek and connected by a branch railway with the Canadian Pacific Railway and the Great Northern Railway at Morrissey. The colliery is about 14 miles from Fernie by rail in a south-westerly direction. This colliery has been shut down since 1909.

Michel Colliery, situated on both sides of Michel creek, on the line of the Canadian Pacific Railway, being 23 miles in a north-easterly direction from Fernie.

The amount and disposition of this combined output of the company's collieries is fully shown in the following table:—

Combined Returns from Crow's Nest Pass Coal Co.'s Mines for Year 1920.

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	132,900		35,805	
" export to United States	408,596		31,718	
" " other countries				
Total sales		541,496		67,523
Used in making coke	101,649			
" under colliery boilers, etc.	53,208			
Total for colliery use		154,857		
Stocks on hand first of year	98		312	
" last of year	120		581	
Difference added to stock during year		22		269
Output of collieries for year		696,375		67,792

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	48		21		69	
Whites—Miners	540				540	
Miners' helpers						
Labourers	116		218		334	
Mechanics and skilled labour	271		185		456	
Boys	11		20		31	
Japanese						
Chinese						
Indians						
Totals	986		444		1,430	

COAL CREEK COLLIERY.

Bernard Caufield, Manager; Jas. Taylor, Assistant Manager.

At this colliery seven mines are being operated, three on the north and four on the south side of the Coal creek. Connection is made with the town of Fernie, Canadian Pacific and Great Northern Railways by a short branch road which is part of the Morrissey, Fernie & Michel Railway. In addition to the coal-train, a passenger service is maintained with the town of Fernie, where the majority of the workmen reside, while about 400 dwellings are provided at Coal Creek for the workmen desirous of living convenient to the works.

The No. 1 East, No. 1 South, and No. 1 North mines are all operating in the No. 1 seam at different points; this seam averages about 25 feet in thickness, the present operations being in the upper 10 feet.

Nos. 2, 3, and 9 mines are in the No. 2 seam, which averages 6 feet in thickness. No. B North is in the B seam, which in about 5 feet thick, with about 4 feet of inferior coal for a floor, part of which is taken up to allow of height for haulage.

The inclination of the above seams averages about 12°, pitching to the east. The method of haulage is by horse from the working-faces to the partings, and then by mechanical haulage, either main or endless-rope or compressed-air locomotives to the tipple. Nos. 1 North, B North, and No. 1 South are situated at an elevation of 200 feet above the tipple; the loaded cars from these mines are lowered by means of gravity-planes, and then conveyed by steam and compressed-air locomotives to the tipple.

The tipple, which is of steel construction throughout, is 840 feet long, extending from one side of the valley to the other and receives coal on both sides. It is equipped with two electrically driven circular dumps, each acting independently, which deliver the coal to feed-conveyors that supply the shaking screens; these separate the slack from the commercial screened coal. The screened coal is then delivered to picking-tables, where all foreign material is picked out before the coal is finally loaded into the railway-cars, these being loaded by means of two Smith hydraulic box-car loaders. The main power plant is situated on the north side of the valley and consists of fourteen boilers, with an auxiliary plant of three boilers on the south side; the total capacity of the whole boiler plant is 3,000 horse-power approximately. Two extra boilers are being installed on the south side to cope with the increasing needs of the mines there and provide the additional power required for the new fans which are expected to be installed at No. 1 East and No. 3 mines in the early part of 1921.

The power to drive the compressed-air hoists and pumps underground is supplied by three compressors having a total capacity of 6,000 cubic feet of free air a minute, compressing it to 100 lb. to the square inch. There is also a Canadian Rand (high-pressure) compressor having a capacity of 1,346 cubic feet of free air a minute, compressing it to 1,100 lb. to the square inch; this provides the power to drive the air-locomotives.

The electric plant consists of two 400-ampere, 250-volt generators and one 280-ampere, 250-volt Crocker-Wheeler generator; all are driven by two Robb-Armstrong engines. This electrical installation provides the power to drive the fans at No. 1 South, No. 1 North, and B North mines, the motors on the tipple, and provides the electric light for all the buildings, yards, and workmen's houses at Coal Creek.

A large and up-to-date lamp-room is situated in a central position at the mines, where the electric lamps used by the workmen, as well as the Wolf safety-lamps used by the officials for testing purposes, are cleaned and repaired. The lamp-room is well equipped with all modern appliances for keeping the lamps in a good state of repair, and has been kept in good condition at all times and the requirements of the "Coal-mines Regulation Act" and special rules well complied with. There are in use at the present time 700 electric head-lamps of the Edison type and fifty Wolf safety-lamps.

A large wash and change room is located convenient to the mines; here each employee has his own locker (of steel construction). The wash-room is directly under the charge of an employee of the coal company, whose duty it is to keep it in a clean and sanitary condition, the workmen providing their own soap and towel.

Adequate stable accommodation is provided for the horses employed in and around the mines, those engaged underground being brought outside at the end of each shift, and machine, car, blacksmith, and repair shops are situated at the mines in addition to those at Fernie.

The following is a brief description of the mines and the conditions prevailing therein throughout the year:—

No. 1. East Mine.

John Caufield, Overman; H. Dunlap, Jas. Duncan, Jas. Maltman, and Thos. Reid, Firebosses.

This mine is situated on the south side of the valley and to the east of the tipple, the seam being reached by a crosscut tunnel at a distance of 215 feet from the entrance. Following the disturbance in November, 1916, the principal operations in this mine have been to the dip; now the Tunnel district is being actively developed and should provide a greater output from this mine.

The method of work is along the lines suggested, following the reports on the bumps in this mine, and includes an extensive system of levels separated by 60-foot pillars and duplicate rooms, each pair separated by 200-foot pillars, only about 15 per cent. of the coal being extracted in the first operation.

At present a pair of parallel entries are being driven to the dip or east of the Main tunnel, the purpose being to connect with another pair of entries that are being driven up from the South split, while another pair of entries are being driven to the west of the tunnel. A number of rooms are ready to start off these west entries, but active development of this district will require the exercise of great care, as this is a portion of the mine that is likely to have trouble from bumps, and much thought and study will be required to ascertain which method of work will be most suitable and afford the greatest maximum of safety to the workmen.

This mine is ventilated by a fan of the Guibal type, which, running at a speed of 148 revolutions a minute, produces an average quantity of 120,000 cubic feet of air a minute, under a 3.5-inch water-gauge; a self-recording water-gauge has lately been installed at this fan.

This mine is divided into four splits; the quantity of air passing in each at the last inspection measured as follows:—Tunnel split, 300 by 72: 21,600 cubic feet of air a minute for the use of twenty-one men and four horses. South split, 430 by 75: 32,250 cubic feet of air a minute for the use of twenty-five men and three horses. Second South split, 300 by 75: 22,500 cubic feet of air a minute for the use of twenty men and three horses. North split, 230 by 88: 20,240 cubic feet of air a minute for the use of twenty-one men and one horse. Main return, 1,280 by 90: 115,200 cubic feet of air a minute for the use of eighty-seven men and eleven horses.

Throughout the year explosive gas has been found twelve times, mostly in cavities in the roof above the timbers, the soft nature of this coal contributing largely to the formation of these cavities. On two occasions the workmen have had to be withdrawn from the South split owing to blow-outs or outbursts of gas taking place; these fouled the air of the district to such an extent that the methane content was higher than the standard of safety as determined by the "Coal-mines Regulation Act." Sufficient warning was given the workmen in each case to enable them to reach a place of safety.

The percentage of methane present in the return air from each district as determined by the Burrell gas-detector varied from 1 per cent. in the North split to 1.9 per cent. in the South split.

General conditions have been good in this mine throughout the year, roadways kept in good shape, and the "systematic timbering" order fairly well attended to at the working-faces. Spraying systems to alleviate the dust are in general use all over the mine, and at all inspections it has been found free from dangerous accumulations of dust, all main roadways being treated with second-burnt ashes. Flue-dust barriers have been erected at the junction of No. 10 East and the main haulage-road with a view to establishing safety-zones at this place.

No. 1 South Mine.

F. Landers, Overman; W. Hynds, W. Stockwell, W. Morgan, and M. Hilton, Firebosses.

This mine is situated half a mile to the west of the tipple and operates the upper and western portions of the No. 1 seam, the workings all being to the rise of the main haulage-road and driving towards the outcrop. It is ventilated by an electrically driven 8- by 4-foot Keith fan, which, running at a speed of 260 revolutions a minute, produces an average quantity of 39,000 cubic feet of air a minute, under a 2.5-inch water-gauge. At the last inspection the ventilation was good and measured as follows:—Main return, 840 by 54: 45,360 cubic feet of air a minute for the use of sixty men and thirteen horses.

At the present time this mine is all on one split, but two levels are now being driven; these, when finished, will allow the above current to be split and divide the mine into two separate splits.

Explosive gas has been found five times during the year, in every case in cavities in the roof above the timbers, the soft nature of the roof making it almost impossible to prevent the formation of these cavities. The percentage of methane in the return air was determined by the Burrell gas-detector varied from 1 to 1.5 per cent., which is well below the standard for ventilation as provided for by section 11, "Coal-mines Regulation Act Amendment Act, 1919."

Roadways have been kept in fairly good condition, although during the latter part of the year serious trouble was encountered from caves, resulting in one case in the closing-off of a portion of No. 4 incline; the coal from this place will eventually be taken out through No. 8 incline. As the roof of this mine consists of from 30 to 40 feet of soft inferior coal and shales, the breaking of one or two timbers means a bad cave and the performing of some very dangerous work before the roadway can be made safe. Under conditions such as these, officials and workmen must see that the regulations enacted for the safety of the mine are strictly attended to, as only by doing so can we hope to reduce our accident list to the lowest possible minimum.

The main return airway is caved in several places and is under repair at the present time. General conditions have been fairly good during the year and the "systematic timbering" order well attended to at the working-faces. Spraying systems are in use all over the mine; these are attended to by persons specially detailed off for that purpose, while all main roads are treated with second-burnt ashes.

No. 1 North Mine.

J. Worthington, Overman; Ed. Rutledge, J. Charnock, and H. Parsons, Firebosses.

This mine is situated on the north side of the valley and also operates in the western portion of No. 1 seam, but as the workings are close to the outcrop there is no trouble from bumps or outbursts of gas and working conditions are fairly good. It is all on one split and is ventilated by an electrically driven 7- by 4-foot Keith fan, which, running at a speed of 214 revolutions a minute, produces an average quantity of 21,000 cubic feet of air a minute, under a 1.8-inch water-gauge. The ventilation was good at the last inspection and measured as follows:—Main intake, 270 by 80: 21,600 cubic feet of air a minute for the use of sixty-one men and ten horses.

During the year explosive gas has been found three times in small quantities in cavities above the timbers. Roadways and working-faces have been kept in good condition and the "systematic timbering" order well attended to at the working-faces. The percentage of methane in the return air has never risen above 0.5 per cent., and as this mine is naturally damp it is free from dust and general conditions have been very good throughout the year.

No. 9 Mine.

Robert Fowler, Fireboss.

This mine is also on the north side of the valley, but operates in the No. 2 seam; the principal work consisted of driving the main and counter levels through the faulted ground on this side with a view to proving this part of the field, also repairing the main return airway, good progress being made with the seam.

Ventilation is produced by a 16- by 4-foot fan of the Guibal type, which, running at an average speed of 54 revolutions a minute, produces 10,000 cubic feet of air a minute, under a 1.3-inch water-gauge. At the last inspection there was a quantity of 11,340 cubic feet of air passing a minute for the use of ten men and two horses.

Explosive gas has never been found during the year in the course of inspection and general conditions have been good. The "systematic timbering" order has been well attended to and the mine kept fairly free from dust.

No. B North Mine.

W. Commons, Overman; Jas. Whyte and Evan Jones, Firebosses.

This mine operates in the B seam and is situated east of the tipple at an elevation of 200 feet above No. 1 seam. It is ventilated by an electrically driven 10- by 3-foot Brazil fan, which, running at a speed of 150 revolutions a minute, produces an average quantity of 40,000 cubic feet of air a minute, under a 1.4-inch water-gauge.

This mine was formerly divided into two splits, called the Slope and Incline splits respectively, but with a view to reducing the methane content in the return air from the Slope district the ventilation was rearranged, and the intake air taken direct to the bottom of the slope, splitting there and returning back up each side of the slope-workings, the return air from the left side ventilating the abandoned workings of the old Incline split. The result so far has been encouraging, a slight reduction being noticed in the methane percentage in the Slope district, but room exists for further improvement, as the following figures show that of the total quantity of air passing in this mine only 53 per cent. is doing duty at the working-faces. The quantity of air passing in each split at the last inspection measured as follows:—Right side of slope, 180 by 60: 10,800 cubic feet of air a minute for the use of twenty-five men and two horses. Left side of slope, 220 by 70: 15,400 cubic feet of air a minute for the use of thirty-five men and five horses. Main return, 750 by 65: 48,750 cubic feet of air a minute for the use of sixty men and seven horses.

During the year explosive gas has been found five times, mostly in cavities in the roof; the men were withdrawn on one of these occasions to allow the counter-slope making connection with the crosscut off the Main slope. General conditions have been fairly good during the year, roads well timbered, and the "systematic timbering" order fairly well attended to at the working-faces. The percentage of methane present in the return air varied from 1.3 to 1.7 per cent.; the Burrell gas-detector indicated 1.4 per cent. in the main return airway at the last inspection.

A spraying system has lately been installed and is attended to by a man detailed off specially for that purpose; this has been the means of keeping down the dust at the faces, while all main roads are treated with second-burnt ashes.

No. 2 Mine.

C. McNay, Overman; J. Bushell, W. Clarkstone, and E. Ward, Firebosses.

This mine is situated on the south side of the valley and operates the south and west portions of No. 2 seam. It is ventilated by a 16- by 8-foot Wilson fan, which, running at a speed of 132 revolutions a minute, produces an average quantity of 32,000 cubic feet of air a minute, under a 3-inch water-gauge.

During the year explosive gas has been found eleven times, always in cavities in the roof above the timbers, while the percentage of methane present in the return air has been kept under 1 per cent., with one exception; the Burrell gas-detector on this occasion indicated 1.2 per cent.

General conditions have been good, roads well timbered, while the "systematic timbering" order has been fairly well attended to at the working-faces. The main return airway is still being enlarged and repaired, good progress being made with the same; this, when completed, should greatly improve ventilating conditions in this mine. All main roads are treated with second-burnt ashes, and pipe-lines are now being installed for the purpose of spraying all working-faces and roadways.

At the last inspection the quantity of air passing in the different splits measured as follows:—High-line split, 100 by 70: 7,000 cubic feet of air a minute for the use of four men and one horse. Rock Tunnel split, 180 by 90: 16,200 cubic feet of air a minute for the use of sixty-one men and six horses. Main return (junction of splits), 460 by 70: 32,000 cubic feet of air a minute for the use of sixty-five men and seven horses. The above figures show a considerable leakage of air and every effort should be made to reduce the same to the lowest possible minimum.

No. 3 MINE.

J. Biggs, Overman; W. Brown, R. Phillips, and E. Caufield, Firebosses.

The operations of this mine are all to the dip of No. 2 mine and in the same seam. It is ventilated by a 16- by 8-foot Wilson fan, which, running at a speed of 142 revolutions a minute, produces an average quantity of 54,000 cubic feet of air a minute, under a 3.5-inch water-gauge.

This mine is divided into two different splits and the quantity of air passing in each at the last inspection measured as follows:—Incline split, 290 by 70: 17,400 cubic feet of air a minute for the use of twenty-seven men and four horses. Slope split, 390 by 50: 19,500 cubic feet of air a minute for the use of thirty-five men and four horses. Main return, 890 by 60: 53,400 cubic feet of air a minute for the use of sixty-two men and eight horses.

During the year explosive gas has been found three times, generally in cavities in the roof, while the percentage of methane present in the return air as determined by the Burrell gas-detector has varied from 1.3 to 1.8 per cent. in the Incline split and from 1.2 to 1.6 per cent. in the Slope split.

General conditions have been found very good in this mine throughout the year, roadways and working-faces well timbered, and the "systematic timbering" order very well attended to. Spraying systems are in use at the working-faces and on all main roads, the latter being also treated with flue-dust and second-burnt ashes.

The following are the official returns from the Coal Creek Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	58,546			
" export to United States	338,466			
" " other countries				
Total sales		397,012		
Used in making coke				
Used under colliery boilers, etc.	34,749			
Total for colliery use		34,749		
Stocks on hand first of year	98			
" last of year	120			
Difference added to stock during year		22		
Output of colliery for year		431,783		

Number of Hands employed, Daily Wages paid, etc.*

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	32		10		42	
Whites—Miners	338				338	
Miners' helpers						
Labourers	90		79		169	
Mechanics and skilled labour	180		101		281	
Boys	8		11		19	
Japanese						
Chinese						
Indians						
Totals	648		201		849	

* Does not include Fernie coke-ovens; not operated since April 4th, 1919.

The following shows the number of days Coal Creek Colliery worked each month during 1920:—

January	24	August	25
February	22	September	25
March	17	October (on strike 10 days)	15
April	25	November	26
May	24	December	25
June	26		
July	25	Total	279

Name of seams or pits—No. 1 North, No. 1 South, and No. 1 East, same seam; No. B, Nos. 2, 3, and 9, same seam.

MICHEL COLLIERY.

T. H. Williams, Manager.

This colliery, also operated by the Crow's Nest Pass Coal Company, is situated on both sides of Michel creek, 24 miles east of Fernie, on the Crowsnest Pass branch of the Canadian Pacific Railway, and also has rail connection with the Great Northern Railway.

The mines operated during the year were No. 3 and No. 3 East on the south side of Michel creek and New No. 8 on the north side; the first-mentioned mines are working the upper No. 3 seam, while No. 8 is working the upper portion of the No. 8 seam, the lower part of which has been sealed off for fire for some years.

The general method of work is pillar and stall in all the mines, pillars being extracted in certain portions of No. 3 East and No. 8 mines. Haulage is by horse from the working-faces to the partings, from which the loaded cars are taken to the tipple by means of gravity-inclines, main and endless-rope haulage, and compressed-air locomotives.

As the No. 8 mine is situated at an elevation of 500 feet above the tipple, the loaded cars from this mine are weighed at the top of the incline, where the coal is dumped into bunkers, then loaded into skips and lowered by gravity, and again dumped into other bunkers situated at the bottom of the incline, where it is loaded into mine-cars, these being conveyed to the tipple by endless-rope haulage.

A steel tipple, 664 feet in length and 14 feet in width, extends right across the valley and receives coal on both sides; the loaded cars from the South side are weighed at the foot of the tipple incline, up which they are taken by a Green car-haul consisting of an endless chain which travels on car-wheels, the latter acting as pushers or retarders of the mine-cars on the incline. The track for the mine-cars is laid inside that on which the pusher-wheels run, and when a car is delivered at the bottom of the incline the pusher-wheels move in behind, gripping the rear wheels of the car, thereby conveying the loaded cars up to the dump on the tipple.

This dump is a continuation of the track, with a pitch increasing from 20° to 60°, and when the car reaches this pitch the door opens, discharging the coal into the dump, the chain-haul continuing to travel around a large sprocket-wheel conveying the car to the overhead track and then back down the incline. On the No. 8 side of the tipple the cars are dumped by an automatic dump and returned by a transfer underneath the track to the endless-rope haulage, which conveys them back to the bunkers at the bottom of No. 8 incline. The tipple is equipped with shaking screens and picking-tables, the slack being conveyed by a travelling belt to the slack-bins, from which it is drawn into cars and conveyed by steam-locomotive to the coke-ovens. The tipple machinery is driven by electric power, provision being made for loading open and box cars, the latter being handled by two Smith gravity box-car loaders.

The boiler-plant consists of eleven boilers having a total capacity of 1,650 horse-power, and along with the power plant are housed in a fire-proof brick building. Power to drive the underground hoists and pumps is provided by two compressors—one of the Walker, the other of the Rand type—having a total capacity of 8,000 cubic feet of free air a minute, compressing it to 100 lb. to the square inch. Power to drive the air-locomotives is provided by a high-pressure Rand compressor having a capacity of 1,450 cubic feet of free air a minute, compressing it to 1,200 lb. to the square inch.

The electric plant consists of two 250-kw. generators, which provide the power for the tipple machinery and lighting purposes around the colliery and the town of Michel.

A well-equipped lamp-room is situated in a central position at the mines, where the electric head-lamps used by the workmen and the Wolf safety-lamps used by the officials for testing purposes are cleaned and repaired. There are in use at the present time 345 electric head-lamps of the Edison type and twenty Wolf safety-lamps, while Burrell gas-detectors are provided to enable the detection of lower percentages than could be detected by the ordinary safety-lamp.

Large stables are provided for the forty horses employed in and around the mines; those employed underground are brought out at the end of the shift. A large wash and change room is located convenient to the mines, where each employee has his own locker (of steel construction) and provides his own soap and towel. Well-equipped machine, blacksmith, car, and repair shops are located in a central position at the colliery.

Following is a brief description of the mines and the conditions prevailing therein:—

No. 3 Mine.

M. Littler, Overman; A. Frew, A. Davies, T. Owens, and T. James, Firebosses.

This mine is operating the upper No. 3 seam and is reached by means of a level tunnel from the surface which crosscuts Nos. 3, 4, and 5 seams; the two latter seams have been abandoned for some time. It is ventilated by a 12- by 6-foot Murphy fan, which, running at a speed of 124 revolutions a minute produces on an average 54,000 cubic feet of air a minute, under a water-gauge of 1.7 inches.

This mine is divided into two separate splits; the quantity passing in each split at the last inspection measured as follows:—West split, 400 by 80: 32,000 cubic feet of air a minute for the use of twenty-nine men and four horses. East split, 900 by 30: 27,000 cubic feet of air a minute for the use of twenty-four men and three horses. Main return, 540 by 100: 54,000 cubic feet of air a minute for the use of fifty-three men and seven horses.

At no time during the year has explosive gas been found in the course of inspection and the percentage of methane present in the return air has always been kept around 1 per cent. General conditions have been very good, roadways and working-faces well timbered, and the "systematic timbering" order fairly well attended to. Spraying systems are in general use all over the mine, while all main roads are treated with second-burnt ashes. A good supply of timber is provided for the use of the workmen and kept in a convenient place close to the working-faces.

No. 3 East Mine.

M. McLean, Overman; B. Ball, Alf. Ball, and W. Picton, Firebosses.

This mine is also operating the upper No. 3 seam and is ventilated by a 16- by 8-foot Wilson fan, which, running at a speed of 126 revolutions a minute, produces an average quantity of 90,000 cubic feet of air a minute, under a 2.5-inch water-gauge. It is ventilated by two separate splits; the quantity passing in each at the last inspection measured as follows:—West side, 350 by 120: 42,000 cubic feet of air a minute for the use of forty-four men and four horses. No. 6 East split, 350 by 60: 21,000 cubic feet of air a minute for the use of forty men and five horses. Main return, 1,400 by 63: 88,200 cubic feet of air a minute for the use of eighty-four men and nine horses.

In the course of inspection during the year explosive gas has been found three times in cavities in the roof. The "systematic timbering" order has been fairly well attended to at the working-faces and the roadways are in fairly good condition, but there is room for further improvement in the East and West side return airways.

The percentage of methane in the return air has been kept below the standard for ventilation as provided for by section 11, "Coal-mines Regulation Act Amendment Act, 1919." Repairing and enlarging the airways on the West split has improved ventilating conditions in this district, with a consequent reduction in the methane percentage as determined by the Burrell gas-detector.

Spraying systems are in general use throughout the mine, with the exception of a part of the West side workings, where, owing to a rearranging of the pipe-lines, watering of faces and roadways has been discontinued for some time. As this is one of the most practical methods adopted to alleviate the dust, it should not on any account be neglected by mining men, as only by paying the closest attention to the removal of the dust and the thorough watering of all dusty places can we hope to eliminate or reduce the danger arising from this condition. A good supply of timber is provided at all times for the use of the workmen and placed convenient to the working-faces.

No. 8 Mine.

T. Baybutt, Overman; A. Almond, E. Ainsworth, J. Marsh, and R. Taylor, Firebosses.

This mine is situated on the north side of the valley at an elevation of 500 feet above the tipple and operates the upper and northern portion of No. 8 seam. It is ventilated by a compressed-air-driven 8- by 4-foot Murphy fan, which, running at a speed of 145 revolutions a minute, produces an average quantity of 35,000 cubic feet of air a minute, under a water-gauge of 0.5 inch. At the last inspection the ventilation was good and measured as follows:—West side, 180 by 70: 12,600 cubic feet of air a minute for the use of thirty-two men and five horses. No. 6 incline, 200 by 90: 18,000 cubic feet of air a minute for the use of forty-three men and four horses. Main return, 490 by 70: 34,300 cubic feet of air a minute for the use of seventy-five men and nine horses.

Explosive gas has been found four times during the year in the course of inspection. Roadways are in good condition and well timbered and the "systematic timbering" order well attended to at the working-faces, while a good supply of timber is provided for the use of the workmen. As this mine is naturally damp, it has been fairly free from dust at all times, and the percentage of methane present in the return air has always been under 1 per cent. and conditions generally have been good.

The following are the official returns of the Michel Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	74,354		35,805	
" export to United States	70,130		31,718	
" " other countries				
Total sales		144,484		67,523
Used in making coke	101,649			
Used under colliery boilers, etc	18,459			
Total for colliery use		120,108		
Stocks on hand first of year			312	
" last of year			581	
Difference added to stock during year				269
Output of colliery for year		264,592		67,792

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC. (INCLUDING COKE-OVENS).

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	16		11		27	
Whites—Miners	202				202	
Miners' helpers						
Labourers	26		139		165	
Mechanics and skilled labour	91		84		175	
Boys	3		9		12	
Japanese						
Chinese						
Indians						
Totals	338		243		581	

The following shows the number of days Michel Colliery worked each month during 1920:—

January	26	August	26
February	22	September	24
March	20	October (on strike 11 days)	14
April	24	November	26
May	24	December	25
June	26		
July	24	Total	281

Name of seams or pits—New No. 3 (top section of No. 3 seam); Old No. 3 (lower section of No. 3 seam); New No. 8 (Old No. 8 seam continued).

Corbin Coal and Coke Company, Limited.

Head Office—Spokane, Wash.

Capital, $7,000,000.

Officers.	*Address.*
Rush Taggert, President,	New York, N.Y.
J. K. O. Sherwood, Vice-President,	New York, N.Y.
Wm. Weaver Heaton, Secretary-Treasurer,	New York, N.Y.
A. M. Allen, Assistant Treasurer,	Spokane, Wash.
R. S. Ord, General Manager,	Spokane, Wash.
E. L. Warburton, Mine Manager,	Corbin, B.C.

Value of plant, $400,000.

CORBIN COLLIERY.

E. L. Warburton, Manager.

This colliery is situated on the right bank of Michel creek and has railway connection with the Crowsnest Pass branch of the Canadian Pacific Railway at McGillivray Junction by a branch line 14 miles in length called the British Columbia Eastern Railway.

The boiler plant at this colliery consists of two Jencks return-tubular boilers and one locomotive-type boiler, the total capacity of the plant being approximately 275 horse-power.

The electric plant, consisting of one 70-horse-power generator, alternating type, 2,300 volts, driven by one 100-horse-power steam-engine, provides the power to drive the motors at the machine-shops and the electric air-drill at No. 6 mine, and for lighting purposes around the plant and the town of Corbin; it will also provide the power for several 3-horse-power motors that are being installed to drive a Sirocco fan and two small disk fans which will be required in the early part of 1921.

The tipple, which is constructed of wood, has a bunker capacity of 1,200 tons and is equipped with a Marcus screen and conveyor-belt, driven by a 60-horse-power steam-engine. There is a wash and change room located in a convenient position at the colliery, also a well-equipped lamp-room, where the electric head-lamps used by the workmen and the Wolf safety-lamps used by the officials for testing purposes are cleaned and repaired. There are in use at this colliery electric head-lamps of the Edison type and Wolf safety-lamps, while a Burrell gas-detector is provided to enable the detection of lower percentages of methane than could be determined by the ordinary safety-lamp.

In addition to the offices and warehouse, blacksmith, car, and repair shops are situated at the mines, while at the wye well-equipped machine-shops are maintained where the locomotives are overhauled and repaired.

Following is a brief description of the mines operated during the year and the conditions prevailing therein:—

No. 3 MINE, OR "BIG SHOWING."

John Virgo, Fireboss.

This mine is situated at an elevation of 800 feet above and at a distance of 2 miles from the town of Corbin, and is generally termed an open-cut or stripping mine. The seam at this point being very close to the surface, the overburden is stripped off by steam-shovels, loaded into dump-cars, and hauled to the dump, which is situated in such a position as not to interfere with future operations. When the surface material and coal-blossom is all cleaned off the

section in operation, work proceeds in the coal-seam by a series of benches or steps. Blasting is done where the coal is hard, stumping-powder being used for this purpose; all shots are fired under the direct supervision of a competent official.

The coal is loaded by steam-shovel directly into the railway-cars; these are hauled by Shay locomotives specially built for the purpose of hauling on heavy grades. A switchback railway 6 miles in length connects the mine with the tipple. The above railway is owned by the coal company and is equipped with turntables at convenient points for the purpose of turning the snow-plough and allowing of greater efficiency when it is required, as compared with the old system of running the full seven miles back to the wye for the above purpose.

General supervision with respect to the safety of the workmen has been well maintained during the year.

No. 4 Mine.

J. Blair, Overman; H. Osborne, W. Almond, G. Luck, and G. Elmes, Firebosses.

This mine is situated to the west of No. 1 mine and operates the No. 4 seam, which is vertical and varies in thickness from 50 to 200 feet. The general system of work is by driving pairs of levels, with a vertical distance of 100 feet between each pair and connected by raises 5 by 8 feet, angle chutes being driven off these raises to the level above to facilitate pillar-drawing.

Pillars are extracted on the retreating caving system, the chutes being arranged so that the coal falls towards them with very little loss. The upper workings of this mine are reached by an incline direct from the tipple. The method of haulage inside the mine is by horse and main and tail rope to the incline, down which the cars are lowered by steam-hoist. Frequent and careful examination of the fire area has failed to reveal any fresh outbreaks during the year; the extensive concrete stoppings erected last year at the No. 4 level have apparently checked the fire at this point.

Ventilation is produced by a 12- by 4-foot fan of the Guibal type, which, running at a speed of 90 revolutions a minute, produces an average quantity of 30,000 cubic feet of air a minute, under a water-gauge of 0.5 inch. The quantity passing at the last inspection measured as follows:—Main intake, 1,130 by 30: 33,900 cubic feet of air a minute for the use of thirty-four men and two horses.

Very little trouble is encountered from gas and no explosive gas has been found in the course of inspection during the year. Roadways are kept in good condition, the "systematic timbering" order well attended to at the working-faces, and a good supply of timber is provided at all times for the use of the workmen. As it is naturally damp, this mine has always been found free from dust and the percentage of methane in the return air has been kept below 0.5 per cent.

Nos 5 and 6 Mines.

J. Blair, Overman; H. Ferryman, Fireboss.

No. 5 mine is still in the prospect stage, the principal work consisting of driving the main and counter levels through a piece of faulted ground with a view to proving this part of the field. Gas has not yet been found in this mine; ventilation is natural and has been good at all times. A small disk fan will be installed in the near future.

Up to the present time the principal work at No. 6 mine has been prospecting and proving the extent of the coal-seam by driving level drifts at different points with a view to ascertaining the actual thickness of the seam. At a lower elevation than the above drifts a level rock tunnel is being driven to tap the seam, and if this reaches the seam at a reasonable distance from the surface it is the intention of the management to drive another tunnel at a still lower elevation and on the same level as the tipple. During the late summer the railroad-track was extended to this mine and a new tipple built; a temporary chute has also been erected to allow of the upper levels being developed while the lower tunnels are driving in towards the seam. This mine gives every promise of being an important and valuable addition to the mines of this colliery.

The following are the official returns from the Corbin Colliery for the year ending December 31st, 1920:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	72,176			
" export to United States	70,746			
" " other countries				
Total sales		142,922		
Used in making coke				
" under colliery boilers, etc.	5,589			
Total for colliery use		5,589		
Stocks on hand first of year	4,019			
" last of year	6,522			
Difference added to stock during year		2,503		
Output of colliery for year		151,014		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	6	8.27	5	8.18	11	8.22
Whites—Miners	56	9.87			56	9.87
Miners' helpers	14	6.89			14	6.89
Labourers			41	6.83	41	6.83
Mechanics and skilled labour			29	8.06	29	8.06
Boys			1	4.40	1	4.40
Japanese						
Chinese						
Indians						
Totals	76		76		152	

Name of seam or pit—No. 3 mine, open-work; Nos. 4, 5, and 6 mines, underground.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 3 and 4 mines as per previous reports, with following adjustments: About 90 per cent. of output from No. 4 mine from pillar or caving system; 300 level and "A" tunnel, whole work. During 1920 70,000 cubic yards of stripping was removed at No. 3 or open-work operations. Rock tunnel 1,000 feet to the north and 75 feet below present No. 3 open-work has been advanced about 70 feet. All work at No. 3 was abandoned for season early in December. At No. 4 mine a rock-drift was driven through the right wall of left basin into a right-hand basin of coal. This is now opened out with levels and crosscuts, pillars being formed 75 by 140 feet. At "A" tunnel, No. 4 mine, considerable work has also been put in to get to right-hand basin of coal and to ultimately work as parallel operation to 300 level. No. 5 mine during year has been in prospect stage, but is now into vertical basin of coal 70 feet in width, and at an early date this mine should be on a shipping basis. At No. 6 mine considerable work has been done

erecting tipples and chutes to upper levels of this basin of coal. From prospect-work at this point the basin of coal would indicate running almost parallel with Corbin creek for a considerable distance, probably 1½ miles and about 300 feet wide, with depth unknown. A rock tunnel is now being driven at this point by rock-drilling machine and has advanced 125 feet. It is expected to strike coal at about 200 feet. Tipples, chutes, spur railway, etc., are now advanced to a point whereby coal can be shipped from upper levels until other work at this unit is complete.

Description and length of tramway, plant, etc.—As per previous report, with following additions: New incline hoist and housing installed and working at No. 4 Mine; horse-haulage, 300 level and "A" tunnel, No. 4 mine; electric line installed to No. 6 mine to drive No. 5 Temple-Ingersoll-Rand drilling-machine; spur railway from high line built to No. 6 mine, 3,000 feet in length; tipple at No. 6 mine; trestle-work and chutes from tipple to upper levels at No. 6 mine; new boarding-house to accommodate fifty workmen; G.W.V.A. Hall erected; ten steel main-line hopper-bottom cars.

PER CAPITA PRODUCTION OF COLLIERIES, 1920.

District.	Gross Tons of Coal mined in 1920.	Total Number of Men employed by Producing Collieries.	Tons of Coal mined per Man employed at Collieries.	Number of Men employed Underground in Producing Collieries.	Tons of Coal mined per Man employed Underground.
East Kootenay	847,389	1,582	535	1,062	797
Coast	1,849,385	4,767	385	3,129	591
Total for Province	2,696,774	6,349	425	4,191	643

PROSECUTIONS UNDER "COAL-MINES REGULATION ACT."

As is incumbent upon the Inspector, he has laid information before the local Magistrates in the following cases of infractions by the workmen in the mines of the General and Special Rules and Regulations which are provided for the safety of all underground employees. The carelessness of one man endangers the lives of his fellow-workmen, and is treated as a criminal offence.

The following prosecutions have been brought during the year for the offences noted; the judgments given by the Magistrate being shown:—

Date.	Name.	Mine.	Occupation.	Offence charged.	Judgement.
Jan. 28	Isaac Hill.....	Wakesiah.....	Fireboss ...	For allowing two shot-holes to be tamped at one time	Fined $10 and costs.
Feb. 6	Tom Radish...	Morden.....	Labourer....	For fraudulently making use of another man's certificate	Fined $10 and costs.
April 11	Robert Walker	No. 7, Cumberland	Fireboss	Breach of Rule 12, sec. 91; tamping two shot-holes at the same time	Fined $10 and costs.
April 14	Dom Langi....	No. 1, Coal Creek	Miner	For having matches in his possession	Fined $10 and costs.
April 14	L. Domovitch..	No. 2, Coal Creek	Miner	Matches in his posession, contrary to Special Rule 9, sec. 91	Fined $10 and costs.
April 30	Thomas Bullen	Granby	Fireboss	For firing shot, contrary to Special Rule 66, sec. 92	Fined $10 and certificate suspended for two months.
May 12	T. Richards...	Wellington Extension Col'ry	Miner	For violating Rule 11	Fined $5 and costs.
May 12	Harry Borak .	No. 4, Corbin	Miner	Fighting in mine, contrary to Rule 110	Fined $10 and costs.
May 12	M. Wasylymink	No. 4, Corbin..	Miner	Fighting in mine, contrary to Rule 110	Fined $10 and costs.
May 22	Joe Januk ...	No. 3, Coal Creek	Miner	For having matches in possession, contrary to Special Rule 9, sec. 91	Fined $10 and costs.
Aug. 17	F. Mattinderfer	B North, Coal Creek	Miner	Failing to sprag coal, contrary to Special Rule 115	Fined. Dismissed.
Aug. 28	R. Derbyshire.	No. 1 East, Coal Creek	Miner	Failing to sprag coal, contrary to Special Rule 115	Fined $5 and costs.
Aug. 28	F. Sorrinto....	Coal Creek....	Miner	Failing to sprag coal, contrary to Special Rule 115	Fined $5 and costs.
Oct. 26	J. Magu	Coal Creek....	Miner's helper	Matches in his possession, contrary to Rule 9, sec. 91	Allowed on suspended sentence.
Nov. 10	Joseph Lane...	Wellington Extension Col'ry	Fireboss	For violating Rule 11, by unramming a shot-hole	Fined $10 and costs.
Nov. 16	Jas. Davidson.	No. 2, Coal Creek	Miner	Failing to sprag coal, contrary to Special Rule 115	Fined $5 and costs.
Nov. 16	Ben Drew.....	No. 2, Coal Creek	Miner	Exposing himself to unnecessary danger, contrary to Special Rule 112	Dismissed with caution.
Nov. 16	Wm. Holmes..	No. 1 South, Coal Creek	Driver.....	For having matches in possession, contrary to Rule 9, sec. 91	Fined $5 and costs.
Nov. 16	Leroy Taylor..	No. 3, Coal Creek	Miner	For having matches in his possession	Fined $5 and costs.
Nov. 16	James Parsons.	No. 1 South, Coal Creek	Miner	For having matches in his possession, contrary to Rule 9, sec. 91	Fined $5.
Dec. 9	A. Burbee.....	No. 8, Michel..	Miner	For having matches in his possession, contrary to Rule 9, sec. 91	Fined $10 and costs.

METALLIFEROUS MINES SHIPPING IN 1920.

SKEENA.

SKEENA MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Belmont-Surf Inlet	Surf inlet	Belmont-Surf Inlet Mines, Ltd.	Surf Inlet	Gold, silver, copper.
Drum Lummon	Douglas channel	Drum Lummon Mines, Ltd.	Vancouver	Gold, silver, copper.
Patterson group	Porcher island	F. T. Patterson	Refuge Bay	Gold, silver.

NASS RIVER MINING DIVISION.

Dolly Varden	Alice arm	Taylor Engineering Co., Ltd.	Vancouver	Silver.
Esperanza	Alice arm	Pedro Salinas	Alice Arm	Gold, silver.
Golskeish	Anyox	H. W. Heidman	Anyox	Gold, silver.
Hidden Creek	Anyox	Granby Cons. M. S. & P. Co.	Anyox	Gold, silver, copper.

PORTLAND CANAL MINING DIVISION.

Premier	Salmon river	Premier Gold Mining Co.	Stewart	Gold, silver.
Silver Tip	Salmon river	Silver Tip Mining Syndicate	Vancouver	Gold, silver, lead, zinc.

QUEEN CHARLOTTE MINING DIVISION.

Ikeda	Ikeda bay	Ikeda Mines, Ltd.	Vancouver	Gold, silver, copper.

OMINECA MINING DIVISION.

Silver Standard	Hazelton	W. G. Norrie-Lowenthal	New Hazelton	Gold, silver, lead, zinc.

EAST KOOTENAY.

FORT STEELE MINING DIVISION.

North Star	Kimberley	Thompson & McKinney	Kimberley	Silver, lead.
St. Eugene	Moyie	Consolidated M. & S. Co.	Kimberley	Silver, lead, zinc.
Sullivan	Kimberley	Consolidated M. & S. Co.	Kimberley	Silver, lead, zinc, iron pyrites.

WINDERMERE MINING DIVISION.

Bunyan	Windermere	E. J. Fader	Wilmer	Gold, silver, lead.
Helldriver	Windermere	J. L. McKay	Athalmer	Silver, lead.
Isaac	Frances creek	Paul Denhart	Brisco	Silver, lead.
Monarch	Golden	Wm. Adkins	Vancouver	Silver, lead.
Paradise	Toby creek	R. R. Bruce	Invermere	Silver, lead.
Ptarmigan	Toby Creek	E. W. Watson	Wilmer	Silver, copper.

WEST KOOTENAY.

AINSWORTH MINING DIVISION.

Bluebell	Riondel	S. S. Fowler	Riondel	Silver, lead.
Caledonia	Blaylock	G. E. McCready	Zincton	Silver, lead.
Florence	Ainsworth	F. R. Wolfle	Spokane	Silver, lead.
Highland	Ainsworth	Consolidated M. & S. Co.	Trail	Silver, lead.
Index	Ainsworth	E. J. Edwards	Kaslo	Silver, lead.
Kirby	Riondel	A. J. Curle	Kaslo	Silver, lead.
Krao	Ainsworth	W. E. Zwicky	Kaslo	Silver, lead.
Little Phil	Ainsworth	J. W. Smith	Ainsworth	Silver, lead.
Maestro	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
No. One	Ainsworth	Consolidated M. & S. Co.	Trail	Silver, lead.
Ruth	Ainsworth	W. D. Smith	Ainsworth	Silver.
Silver Bell	South fork, Kaslo creek	W. E. Newton	Kaslo	Silver, lead.
Silver Bear	South fork, Kaslo creek	M. S. Davys	Kaslo	Silver, lead.
Spokane-Trinket	Ainsworth	Jas. McDougall	Ainsworth	Silver, lead.
Skyline	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
Tam O'Shanter	Riondel	C. F. Sherwin	Riondel	Silver.
Tariff	Ainsworth	J. W. Smith	Ainsworth	Silver, lead.
United	Ainsworth	J. W. Smith	Ainsworth	Silver, lead.
Utica	Paddy peak	C. F. Caldwell	Kaslo	Silver, lead.
Whitewater	Retallack	W. H. Burgess	Kaslo	Gold, silver, lead, zinc.

SLOCAN MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Alamo	Alamo	C. Cunningham	Sandon	Silver, lead.
Antoine	McGuigan basin	James Anderson	Kaslo	Silver, lead.
Bosun	New Denver	Rosebery-Surprise Mining Co.	New Denver	Silver, lead, zinc.
Canadian and Adams	Sandon			Silver, lead.
Comstock	Slocan	Rosebery-Surprise Mining Co.	New Denver	Silver, lead.
Hewitt	Silverton	J. F. Duthie	Seattle	Silver, lead.
Idaho	Sandon	C. Cunningham	Sandon	Silver, lead.
Ivanhoe	Sandon	Rosebery-Surprise Mining Co.	Sandon	Silver, lead.
Last Chance	Sandon	Robt. Cunning	Sandon	Silver, lead.
McAllister	Three Forks	R. A. Grimes	Three Forks	Silver, lead.
Mollie Hughes	New Denver	H. Clever	New Denver	Gold, silver, lead.
Mowitch	New Denver	J. Beber	New Denver	Gold, silver.
Noble Five	Sandon	Paul Lincoln	Sandon	Silver, lead.
Payne	Sandon	Oscar V. White	Sandon	Silver, lead.
Queen Bess	Sandon	C. Cunningham	Sandon	Silver, lead.
Rambler	Three Forks	W. A. Cameron	Three Forks	Silver, lead, zinc.
Redress	Sandon			Silver, lead.
Richmond	Sandon	C. Cunningham	Sandon	Silver, lead.
Ruth	Sandon	James Anderson	Kaslo	Silver, lead.
Silver Glance	Zincton	J. W. Power	Kaslo	Silver.
Silversmith	Sandon	John B. White	Sandon	Silver, lead, zinc.
Sovereign	Sandon	C. Cunningham	Sandon	Silver, lead.
Standard	Silverton	A. N. North	Silverton	Lead, zinc.
Surprise	Sandon	J. P. McFadden	Sandon	Gold, silver, lead, zinc.
Van-Roi	Silverton	C. Cunningham	Sandon	Silver, lead.
Washington	Rambler	W. H. Burgess	Kaslo	Silver, lead.
Wonderful	Sandon	C. Cunningham	Sandon	Silver, lead.

SLOCAN CITY MINING DIVISION.

Anna	Springer creek	K. E. Zimmerman	Slocan	Silver.
L. T.	Springer creek	D. B. O'Neail	Slocan	Silver, lead.
Ottawa	Slocan	A. L. McPhee	Slocan	Silver.
Republic	12-Mile creek	A. H. Bonner	Calgary	Gold, silver.

NELSON MINING DIVISION.

Aspen	Deer creek	P. F. Horton	Nelson	Silver.
Emerald	Salmo	R. W. Mifflin	Salmo	Silver, lead.
Molly Gibson	Kokanee creek	Consolidated M. & S. Co.	Trail	Silver, lead.
Nugget	Sheep creek	Harold Lakes	Salmo	Gold.
Second Relief	Erie	A. D. Westby	Erie	Gold, silver, copper.
Yankee Girl	Ymir	Mining Corporation of Canada	Ymir	Gold, silver, lead.

TRAIL CREEK MINING DIVISION.

Centre Star	Rossland	F. S. Peters	Rossland	Gold, silver, copper.
Le Roi No. 2	Rossland	P. S. Couldrey	Rossland	Gold, silver, copper.
Mountain Chief	Renata	J. W. Evans	Nelson	Gold, silver, copper.
Velvet	Rossland	C. E. Nordman	Rossland	Gold, silver, copper.
White Bear	Rossland	Consolidated M. & S. Co.	Rossland	Gold, silver, copper.

REVELSTOKE, TROUT LAKE, AND LARDEAU MINING DIVISIONS.

Lanark	Illecillewaet (Revelstoke)	W. B. Dornberg	Illecillewaet	Silver, lead.
Ferguson	Trout lake	James Anderson	Kaslo	Gold, silver, lead.

BOUNDARY.

GREENWOOD MINING DIVISION.

Bell	Beaverdell	D. McIntosh	Beaverdell	Gold, silver, lead.
Can. Copper Corpn.	Greenwood	Canada Copper Corporation	Greenwood	Gold, silver, copper.
Castor Frac.	Beaverdell	R. D. McKenzie	Greenwood	Silver.
Crescent	Greenwood	Geo. Thompson	Greenwood	Gold, silver, lead.
Kokomo	Beaverdell	J. M. Barrett	Beaverdell	Gold.
Last Chance	Greenwood	James Poggi	Greenwood	Gold, silver.
Napanee	Beaverdell	E. G. Cummings	Beaverdell	Gold, silver, lead.
Providence	Greenwood	A. J. Morrison	Greenwood	Gold, silver, lead.
Rambler	Beaverdell	W. H. Rambo	Beaverdell	Silver, lead.
Sally	Beaverdell	E. A. Morley	Penticton	Silver, lead.
Skylark	Greenwood	C. D. Hunter	Vancouver	Gold, silver.
Sunnyside	Greenwood	E. Williamson	Rock Creek	Gold, silver, lead.
Wellington	Wallace mountain	J. Sutherland	Beaverdell	Silver, lead.

GRAND FORKS MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Emma	Eholt	Consolidated M. & S. Co.	Trail	Gold, silver, copper.
Lightning peak	Lightning peak	W. A. Calder	Edgewood	Silver, lead.
Molly Gibson	Paulsen	I. J. Trembath	Rossland	Gold, silver.
Rock Candy	Grand Forks	Consolidated M. & S. Co.	Trail	Fluorspar.
Union	Grand Forks	Lewis Johnson	Grand Forks	Gold, silver.
Waterloo No. 2	Lightning peak	G. A. Rendell	Greenwood	Silver, lead.
Yankee Boy	Hardy mountain	J. Bailey	Eholt	Gold, silver, lead.
Granby smelter	Grand Forks	Granby Cons. M. S. & P. Co.	Vancouver	Gold, silver, copper.

OSOYOOS MINING DIVISION.

Nickel Plate	Hedley	S. L. Smith	Hedley	Gold, arsenic.
Horn Silver	Similkameen	E. W. Condit	Similkameen	Gold, silver.
Stemwinder	Fairview	Henry Lee	Vancouver	Gold, silver.

SIMILKAMEEN MINING DIVISION.

Copper mountain	Allenby	Canada Copper Corporation	Allenby	Gold, silver, copper.
Joshua	Nicola	F. M. Hawkes	Seattle	Gold, silver, lead.
Voight	Copper mountain	Emil Voight	Princeton	Silver, copper.

LILLOOET AND CLINTON MINING DIVISIONS.

Lorne	Cadwallader creek	A. F. Noel	Lorne Mine	Gold.

YALE, ASHCROFT, AND KAMLOOPS MINING DIVISIONS.

Iron Mask	Kamloops	A. Wallinder	Kamloops	Gold, silver, copper.
Emancipation	Yale	B. H. Heyer	Vancouver	Gold, silver.

SOUTH COAST.

VANCOUVER MINING DIVISION.

Britannia	Howe sound	E. J. Donohue	Britannia Beach	Gold, silver, copper.
Iron King	Alta lake	J. H. Thompson	Vancouver	Iron.

NANAIMO MINING DIVISION.

Venus	Lasqueti island	Henry Lee	Lasqueti island	Gold, silver, copper.

CLAYOQUOT MINING DIVISION.

Indian Chief	Sidney inlet	S. P. Silverman	Sidney Inlet	Gold, silver, copper.

VICTORIA MINING DIVISION.

Hill 60	Cowichan lake	E. F. Miller	Duncan	Manganese.

LIST OF CROWN-GRANTED MINERAL CLAIMS.

CROWN GRANTS ISSUED IN 1920.

CASSIAR.

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Chakawana	Atlin	James A. Fraser, Official Administrator of the estate of Frederick William Markus, deceased, intestate	3289	45.42	Jan. 27
Nest Egg	"	Alexander Barrington Taylor and Robert Webster	3292	50.24	Jan. 27
Alice Fraction	Nass River	John Edmund Stark and Herbert Francis Kergin	3515	32.30	Nov. 18
Beaver	"	Granby Consolidated M. S. & P. Co., Ltd.	3895	50.35	Mar. 9
Blue Jay	"	" "	3874	41.63	Mar. 19
Clark	"	" "	3869	47.64	Mar. 18
Dandy No. 2 Fraction	"	Frank Stringham	3617	50.60	Dec. 28
David Copperfield	"	William McLean, Alfred Wright, Alfred E. Wright, and Robert F. McGinnis	3520	19.06	Nov. 12
Drum Lummon Fraction	"	Granby Consolidated M. S. & P. Co., Ltd.	3879	50.05	Mar. 19
Iron Bug	"	" "	3875	45.43	Mar. 19
Jimm Fraction	"	" "	3870	26.89	Mar. 18
John Bull	"	" "	3876	51.65	Mar. 19
John Bull No. 1	"	" "	3877	51.15	Mar. 19
John Bull No. 3	"	" "	3878	45.52	Mar. 19
Kitzol No. 1	"	William Martin	3815	39.61	Sept. 28
Kitzol No. 2	"	"	3814	35.38	Sept. 28
Maud McPhee	"	"	3817	47.16	Sept. 28
Mohawk	"	George R. Naden	3512	51.41	May 13
Mohawk No. 1	"	"	3514	43.52	May 13
Mohawk No. 2	"	"	3513	45.19	May 13
Molybdenum	"	Brian H. Tyrwhitt Drake, Registrar of Supreme Court, Victoria Registry	3648	17.90	May 27
Nephin Fraction	"	Granby Consolidated M. S. & P. Co., Ltd.	3872	38.83	Mar. 18
Rob Roy	"	" "	3871	31.18	Mar. 18
Sportsman	"	William Martin	3816	48.13	Sept. 28
Sunset No. 1	"	"	3818	11.46	Sept. 28
Sunset No. 2	"	"	3819	45.48	Sept. 28
Sundog Fraction	"	Granby Consolidated M. S. & P. Co., Ltd.	3873	43.84	Mar. 19
Success	"	Brian Tyrwhitt Drake, Registrar of Supreme Court, Victoria Registry	3652	29.39	May 27
Silver Tip No. 1	"	Franz August Swanson	3823	39.61	Nov. 18
Silver Tip No. 2	"	John H. McMullen, Official Administrator of the estate of Charles Swanson, deceased, intestate	3824	17.60	Nov. 18
Wolf	"	John Edmond Stark	3821	39.34	Oct. 8
Albana	Omineca	John B. Paine	6328 R. 5	47.67	Aug. 23
Balmoral Fraction	"	Delta Copper Co	620	2.41	April 29
Balmoral	"	"	1002	45.11	April 29
Caribou	"	Cassiar Crown Copper Co.	6476 R. 5	26.86	May 27
Chalco	"	Delta Copper Co	514	49.34	April 29
Chicago	"	"	513	51.65	April 29
Copper Crown	"	Cassiar Crown Copper Co.	6472 R. 5	50.47	May 27
Crooked Fraction	"	Delta Copper Co	602	46.52	Oct. 9
Delta	"	"	600	51.65	April 29
Delta Fraction	"	"	604	48.18	April 29
Drumbo Fraction	"	John B. Paine	6322 R. 5	27.38	Aug. 9
Emma	"	Lewis W. Patmore	71 R. 5	50.37	May 22
Eureka	"	Cassiar Crown Copper Co.	6473 R. 5	51.64	May 27
Fiddler	"	John B. Paine	6323 R. 5	42.85	Aug. 19
Grand View	"	Cassiar Crown Copper Co.	6475 R. 5	37.72	May 27
Happy Jack	"	Delta Copper Co	1003	48.63	April 29
Hedley	"	John B. Paine	6324 R. 5	45.42	Aug. 19
Highland Boy	"	Delta Copper Co.	1000	49.84	April 29
Hope	"	John B. Paine	6325 R. 5	44.37	Aug. 27
Islander	"	Delta Copper Co	710	51.65	April 29
I.X.L.	"	Lewis W. Patmore	72 R. 5	51.62	May 22
Josie	"	John B. Paine	6321 R. 5	51.44	Aug. 9
Lake View	"	Delta Copper Co	515	20.76	April 29
Lucky Jack	"	"	603	21.69	Oct. 9
Mayflower	"	Cassiar Crown Copper Co.	6471 R. 5	39.08	May 27
Nelson	"	John B. Paine	6326 R. 5	51.65	Aug. 19
Royal Sovereign	"	"	6327 R. 5	39.48	Aug. 23
Ruby	"	Cassiar Crown Copper Co.	6474 R. 5	47.92	May 27
Silver Tip	"	Delta Copper Co	1004	34.90	April 29
Skeena	"	"	606	50.88	April 29
Summit	"	"	601	49.84	April 29
Summit	"	"	605	47.05	April 29
Zig Zag Fraction	"	"	1005	21.24	April 29
Boston	Portland Canal	Forty-nine Mining Co.	4026	51.40	Dec. 28
Chicago	"	"	4027	40.77	Dec. 28
Columbia	"	Arthur Bagg	411	50.82	June 8
Darwin	"	Forty-nine Mining Co.	4028	41.39	Dec. 28
Dickens	"	"	4030	51.65	Dec. 28
Dumas	"	"	4029	51.00	Dec. 28
Evening Sun	"	Arthur Bagg	1517	32.50	June 10

CASSIAR—*Continued.*

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
The "49"	Portland Canal	Forty-nine Mining Co	4024	50.51	Dec. 28
Little Joker	"	Louis Watkins, Charles Douglas Carter, and Patrick Welch	3904	50.17	Feb. 7
Lookout	"	Martin Welch, Harvey James Fetter, and Harry E. Carlton	3905	38.15	Feb. 7
Midas Lake Fraction	"	" " "	3900	35.83	Feb. 7
Midas	"	Charles Douglas Carter and Patrick Welch	3901	25.09	Feb. 7
Mystery	"	Martin Welch, Harvey James Fetter, and Harry E. Carlton	3903	4.22	Feb. 7
Mineral Hill	"	Charles Douglas Carter and Patrick Welch	3902	13.44	Feb. 7
Oxedental	"	Forty-nine Mining Co	4023	51.65	Dec. 28
Pass Fraction	"	Martin Welch, Harvey James Fetter, and Harry E. Carlton	3906	40.55	Feb. 7
Yellowstone Fraction	"	Forty-nine Mining Co	4025	9.39	Dec. 28
King Solomon	Bella Coola	Smelters Steel Co	1087 R. 3	36.15	May 19
Iron King	"	"	1257 R. 3	40.71	Oct. 22
Washburn Lateral	Cariboo	Henry E. C. Carry	9545	49.55	Jan. 27

EAST KOOTENAY.

Bryan	Golden	Alexander David James Mathieson	3951	41.87	May 3
Lincoln	"	Elizabeth Mathieson	3952	44.81	May 3
Lucky Jack	"	Alexander David James Mathieson	3953	37.80	May 3
Dragon	"	William John McRae	3949	37.80	April 8
Copper Belt Fraction	Fort Steele	John H. Hayes	12249	51.31	Nov. 12
Roby Roy	"	"	12250	37.90	Nov. 12
Tillacum	"	"	12251	49.07	Nov. 12
Black Bird	Windermere	John Hopkins Taynton	9178	29.57	May 3
Delight	"	William Walter Taynton	9181	51.65	May 3
Great Northern	"	Dorothy Hanman	5358	43.63	Feb. 10
Grey Eagle	"	John Hopkins Taynton	9179	30.19	May 3
Lucky Boy	"	William Walter Taynton	9180	51.14	May 3
Phoenix	"	Ritchie Spurgeon Gallop	5359	50.23	Feb. 10
World's Fair	"	"	5356	50.29	Feb. 20
Wilderness	"	Dorothy Hanman	5357	30.79	Feb. 20

WEST KOOTENAY.

Dellie Fraction	Ainsworth	William Sheldon Hawley	10711	51.63	Dec. 28
Nellie Fraction	"	"	10713	46.14	Dec. 28
Silver Hoard Fraction	"	"	10712	47.88	Dec. 28
Arnold Fraction	Nelson	William Connolly	12183	4.41	Dec. 28
Big Chief	"	Western Belle Mining Co	12666	35.65	May 19
Gracie R	"	William Connolly	12174	48.43	Dec. 28
Rosebud Fraction	"	"	12185	17.74	Dec. 28
Black Bird	Slocan	Clarence Marsh (the elder)	4180	31.18	May 3
Donnelly	"	John Robert Hunter	5195	35.26	July 23
Elvira	"	George Thomas Gormley	3155	51.65	July 3
Ironside	"	Robert Aylmer Chester	4182	30.25	May 4
Lone Star No. 3	"	Nathan Sawyer Tucker and Thomas Avison	1891	47.65	April 14
Monument No. 2	"	Joseph Miller	5013	51.65	Dec. 28
Monument No. 2 Fraction	"	John T. Miller	5014	12.91	Dec. 28
Monument No. 3	"	Joseph Miller	5011	51.65	Dec. 28
Nonpareil	"	Clarence Marsh (the elder)	4179	47.87	May 3
Nonpareil Fraction	"	Alfred McQueen	4554	14.14	May 4
Seattle	"	Thomas Trenery	4178	38.92	May 17
Seattle Fraction	"	Alfred McQueen	4555	18.58	May 4
Vernon	"	Robert Aylmer Chester	4181	29.65	May 3
Albion Fraction	Trail Creek	Joe Kloman and John Vanebo	12491	3.18	Dec. 28
Albion No. 2	"	" "	12489	28.45	Dec. 28
Duluth	"	Joe Kloman	12490	10.18	Nov. 12

BOUNDARY.

Big Raymond	Grand Forks	Vincenzo Bruno	2596 S.	47.30	July 28
Black Bear	"	"	2597 S.	46.72	July 28
Arcadia	Greenwood	William Clough Wilson	3135	21.70	May 17
Bay Fraction	"	Donald Hugh McGillis	3285	46.00	Dec. 28
Dictator	"	John Glover	4636	51.65	Oct. 9
Hope No. 2	"	William Clough Wilson	1849	41.20	May 17
Helen	"	Ola Lofstad	691	29.94	May 31
Last Chance	"	James Poggi	753	46.83	Oct. 8
Mountain Belle	"	Ellen Hallett	2272	49.76	July 16
Nelson	"	George Arthur Rendell	2293	50.27	June 21
Phoebe	"	Paul Dumont	2790	49.58	Dec. 28
Riverside	"	Paul Nelson	1031	50.13	July 3
Tip Top	"	James Napier Paton	1229	38.43	July 28
Blue Bird	Similkameen	Canada Copper Corporation, Ltd	2574 S.	24.72	Oct. 9
Edna	"	"	2309 S.	48.60	Oct. 9
H. P. Fraction	"	"	2575 S.	13.54	Oct. 9
J. W. Hill	"	Emil F. Voight	2149 S.	50.50	Sept. 11
Lemon No. 15	"	Canada Copper Corporation, Ltd	2004 S.	50.00	Oct. 9
Lemon No. 16	"	" "	2005 S.	51.30	Oct. 9

BOUNDARY—*Continued.*

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
New No. 61	Similkameen	Emil F. Voight	2254 S.	27.20	Oct. 16
No. 18 Fraction	"	"	2256 S.	13.10	Sept. 17
No. 40 Fraction B	"	"	2255 S.	33.10	Sept. 17
No. 60 B	"	"	2164 S.	48.90	Oct. 16
Riverside	"	Canada Copper Corporation, Ltd	2571 S.	25.76	Oct. 9
Rough Neck	"	Emil F. Voight	1802 S.	51.65	Sept. 17
Senora Fraction	"	Canada Copper Corporation, Ltd	2014 S.	1.70	Oct. 9
Senorita	"	" "	2001 S.	47.00	Oct. 9
Eagle Fraction	Osoyoos	Robert C. Johnston	2395 S.	40.82	April 22
Silver Bell	"	Bertram Wood Powell, Leonard Hugh Patten, and James Dallas Brass	2393 S.	36.84	Jan. 7
Silver Horde	Vernon	Gunner Severide	4328	51.65	Dec. 28

VANCOUVER ISLAND AND COAST.

Albright	Nanaimo	William Stramberg	999	37.82	Sept. 24
Black Warrior	"	Redonda Iron Copper Co., Ltd	2446 G. 1	51.65	Jan. 28
Blizzard	"	Edward E. Rorem	465	40.53	Aug. 13
Bonanza	"	Redonda Iron Copper Co., Ltd	2476	51.65	July 12
Copper Cave	"	Edward E. Rorem	151	50.07	Aug. 9
Copperite	"	"	153	51.65	Aug. 9
Dolphin	"	Colin F. Jackson	1039 R. 2	14.98	Jan. 20
Eagle	"	Redonda Iron Copper Co., Ltd	2426 G. 1	38.22	Jan. 28
Gillis Fraction	"	Colin F. Jackson	918a R. 2	4.73	Jan. 20
Hill 60	"	Alexander Kurtzhals	79	41.97	Oct. 16
Homestake	"	Redonda Iron Copper Co., Ltd	2475 G. 1	51.65	Mar. 22
Joan of Arc	"	Rudolf Kurtzhals	80	51.52	Nov. 3
Josephine	"	Harry J. Thomas	378	51.65	April 8
Mars	"	Alexander Kurtzhals	78	42.23	Oct. 19
Sunrise	"	Harry J. Thomas	377	51.05	April 8
Venus	"	Joseph Van-hone Purviance	81	49.03	Nov. 9
Joseph Hunter Fraction	Quatsino	Joseph Hunter	530	19.40	June 24
Young Sports No. 4	"	William James Warren	1556	41.35	Nov. 26
Alberta	Vancouver	Angus Alexander Crowston and Annie Lee Crowston	3844 G. 1	24.44	Sept. 23
Amazon	"	Britannia Mining & Smelting Co.	5004 G. 1	51.38	July 8
Annie	"	" "	4868 G. 1	50.79	Feb. 4
Arrow Fraction	"	" "	2781 G. 1	47.17	Dec. 28
Ash	"	George William Campbell and John Wilson Thornton, Executors and Administrators of the estate of Henry Cornwall Stewart, deceased, and William Barker, Robert Bruce Kirk, and Joel Chase Calhoun	5010 G. 1	42.05	Jan. 26
Atkins	"	Britannia Mining & Smelting Co.	4875 G. 1	47.59	Feb. 4
Atlin Fraction	"	" "	5039 G. 1	11.81	Dec. 28
August Fraction	"	William Arthur Goddard	4028 G. 1	3.77	Feb. 14
Avon Fraction	"	Britannia Mining & Smelting Co.	2780 G. 1	44.45	July 12
Bay No. 1	"	Angus Alexander Crowston	5201 G. 1	39.63	Sept. 24
Bay No. 2	"	" "	5202 G. 1	43.00	Sept. 24
Bay Fraction	"	" "	5203 G. 1	48.34	Sept. 24
Bee	"	Britannia Mining & Smelting Co.	4237 G. 1	40.60	Dec. 29
Bella Fraction	"	" "	2901 G. 1	40.25	Jan. 19
Belmont	"	" "	4998 G. 1	51.56	July 6
Bewick	"	" "	2783 G. 1	21.76	July 12
Bingham	"	" "	4874 G. 1	51.65	Feb. 4
Bow Fraction	"	" "	2774 G. 1	46.23	Dec. 28
British Columbia	"	Angus Alexander Crowston and Annie Lee Crowston	3773 G. 1	49.38	Sept. 17
Burke Fraction	"	Britannia Mining & Smelting Co.	4787 G. 1	50.52	Jan. 30
Caledonia No. 1	"	" "	2784 G. 1	51.65	July 8
Caledonia No. 2	"	" "	2787 G. 1	51.65	July 8
Caledonia No. 3	"	" "	2789 G. 1	51.65	July 9
Caledonia No. 4	"	" "	5036 G. 1	51.65	July 9
Caledonia No. 5	"	" "	5040 G. 1	36.33	July 9
Card	"	" "	4853 G. 1	51.65	June 5
Cathryn	"	" "	4947 G. 1	51.63	Feb. 4
Cedar	"	" "	4034 G. 1	51.11	Jan 20
Cheam Fraction	"	" "	5067 G. 1	48.65	Dec. 28
Chili Fraction	"	" "	5037 G. 1	35.74	Dec. 28
Clio	"	" "	4766 G. 1	50.17	Jan. 29
Clyde	"	" "	5002 G. 1	51.65	July 7
Columbia Fraction	"	" "	2930 G. 1	51.48	Jan. 19
Cortes	"	" "	4784 G. 1	51 65	Feb. 2
Cross Fraction	"	" "	4873 G. 1	51.46	Feb. 4
Cypress	"	" "	4035 G. 1	51.11	Jan. 20
Cyril	"	Angus Alexander Crowston	3853 G. 1	41.77	Sept. 24
Daimler Fraction	"	Britannia Mining & Smelting Co.	2790 G. 1	42.76	July 12
Dakota Fraction	"	" "	4997 G. 1	43.82	July 6
Dan Fraction	"	" "	4869 G. 1	46.35	Feb. 6
Danube Fraction	"	" "	5005 G. 1	38.89	July 7
Day Fraction	"	" "	4583 G. 1	50.26	Feb. 3
Deed Fraction	"	" "	4951 G. 1	46.49	Feb. 4
Doll Fraction	"	" "	4867 G. 1	48.54	Feb. 2
Don Fraction	"	" "	2778 G. 1	47.09	July 12
Douglas	"	Angus Alexander Crowston	3854 G. 1	29.39	Sept. 24
Eagle	"	Britannia Mining & Smelting Co.	4994 G. 1	49.31	July
Eagle Fraction	"	" "	2918 G. 1	51.57	Jan.

VANCOUVER ISLAND AND COAST—*Continued.*

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Eden	Vancouver	Angus Alexander Crowston	3855 G. 1	46.93	Sept. 24
Elm	"	George William Campbell and John Wilson Thornton, Executors and Administrators of the estate of Henry Cornwall Stewart, deceased, and William Barker, Robert Bruce Kirk, and Joel Chase Calhoun	5014 G. 1	41.02	Jan. 26
Etna	"	Britannia Mining & Smelting Co.	5068 G. 1	51.65	Dec. 28
Falls	"	Angus Alexander Crowston	3856 G. 1	38.41	Sept. 24
Fir	"	George William Campbell and John Wilson Thornton, Executors and Administrators of the estate of Henry Cornwall Stewart, deceased, and William Barker, Robert Bruce Kirk, and Joel Chase Calhoun	5011 G. 1	51.65	Jan. 26
Fish	"	Britannia Mining & Smelting Co.	4986 G. 1	39.66	Dec. 28
Flue Fraction	"	" "	4871 G. 1	46.16	Feb. 3
Fly	"	" "	4238 G. 1	25.75	Dec. 28
Fox	"	" "	4851 G. 1	51.65	June 11
French	"	" "	4950 G. 1	51.65	Feb. 4
Frisco Fraction	"	" "	5001 G. 1	44.16	Dec. 28
Gold	"	James Archibald	2317 G. 1	51.65	Aug. 23
Guinea Fraction	"	Britannia Mining & Smelting Co.	5035 G. 1	5.04	Jan. 20
Haig	"	" "	4949 G. 1	51.65	Feb. 6
Hard Fraction	"	" "	4767 G. 1	50.17	Jan. 28
Hardy	"	Angus Alexander Crowston	1711 G. 1	31.16	Sept. 24
Hawk Fraction	"	Britannia Mining & Smelting Co.	2917 G. 1	44.31	Jan. 19
Hawk Fraction	"	" "	4995 G. 1	47.59	July 6
Hazel	"	" "	4988 G. 1	49.70	July 7
Heriot Fraction	"	" "	4783 G. 1	42.15	Feb. 2
Hope Fraction	"	" "	4656 G. 1	51.65	Feb. 3
Hornby Fraction	"	" "	4786 G. 1	38.70	Jan. 30
Hose	"	" "	4852 G. 1	51.65	June 5
Humber Fraction	"	" "	5048	51.23	Dec. 28
Index Fraction	"	Arthur R. Tebb, Alexander McTavish, and Geo. F. Hooey	5155 G. 1	14.82	Aug. 13
Ivy	"	Britannia Mining & Smelting Co.	4803 G. 1	51.65	Jan. 29
Jim Fraction	"	" "	4866 G. 1	40.25	Feb. 3
Josephine	"	" "	4989 G. 1	49.09	Dec. 28
Kerry Fraction	"	" "	2126 G. 1	45.68	Feb. 3
Last Fraction	"	" "	2782 G. 1	12.63	Feb. 2
Layon	"	" "	5000 G. 1	49.48	Dec. 28
London No. 1	"	William James Mogridge	3398 G. 1	49.09	Jan. 22
London No. 2	"	"	3399 G. 1	51.35	Jan. 22
London No. 3	"	"	3392 G. 1	51.64	Jan. 22
London No. 4	"	"	3393 G. 1	51.65	Jan. 22
London No. 5	"	"	4880 G. 1	28.17	Jan. 22
Louise Fraction	"	Britannia Mining & Smelting Co.	5076 G. 1	45.08	Dec. 28
Mammoth No. 2	"	Quincy Dunn Chapman	3401 G. 1	49.47	Jan. 27
Manitoba	"	Angus Alexander Crowston and Annie Lee Crowston	3845 G. 1	44.22	Sept. 23
Maple	"	George William Campbell and John Wilson Thornton, Executors and Administrators of the estate of Henry Cornwall Stewart, deceased, and William Barker, Robert Bruce Kirk, and Joel Chase Calhoun	5012 G. 1	29.15	Jan. 26
Mexico	"	Britannia Mining & Smelting Co.	5044	51.32	July 12
Mons	"	" "	2916 G. 1	49.89	Jan. 19
Moss Fraction	"	" "	4802 G. 1	50.99	Jan. 29
Myrtle B No 1	"	William James Mogridge	3396 G. 1	34.55	Jan. 22
Myrtle B No. 2	"	"	3397 G. 1	34.24	Jan. 22
Nanny	"	Britannia Mining & Smelting Co.	4018 G. 1	51.65	Feb. 6
Napier	"	" "	4984	15.68	Dec. 28
Nelson Fraction	"	" "	4785 G. 1	44.18	Jan. 31
Night	"	" "	4652 G. 1	51.51	Feb. 4
Nimmo Fraction	"	" "	4780 G. 1	48.91	Feb. 2
Noon	"	" "	4655 G. 1	47.72	Feb. 6
Noyon Fraction	"	" "	4999 G. 1	45.74	Dec. 28
Ontario	"	" "	3774	48.21	Sept. 23
Otter Fraction	"	" "	4765 G. 1	47.55	Jan. 29
Pender	"	" "	4778 G. 1	51.44	Jan. 28
Peak Fraction	"	" "	4657 G. 1	45.78	Feb. 5
Peru	"	" "	5038 G. 1	16.38	Dec. 28
Plan	"	" "	8454 G. 1	51.65	June 5
Princess No. 2	"	Clarence R. Briggs	3394 G. 1	34.66	April 30
Princess No. 3	"	"	3395 G. 1	22.21	April 30
Quadra	"	Britannia Mining & Smelting Co.	4781 G. 1	51.65	Feb. 2
Quebec	"	" "	3775 G. 1	29.70	Sept. 17
Queen Anne	"	Angus A. Crowston	1716 G. 1	51.65	May 1
Red Mountain	"	Eliza M. Shupe, George F. Hooey, and Alex. McTavish	5153 G. 1	31.48	Aug. 13
Regal	"	Britannia Mining & Smelting Co.	4232 G. 1	51.65	Jan. 20
Reggie Fraction	"	" "	4032 G. 1	50.49	Feb. 6
Rheims	"	" "	4987 G. 1	50.56	Dec. 28
River	"	" "	422 G. 1	49.66	Jan. 19
Rome Fraction	"	" "	5061 G. 1	10.89	Dec. 28
Root Fraction	"	" "	5078 G. 1	48.05	Dec. 28
Roy	"	" "	2771 G. 1	48.37	June 12
Roy No. 7	"	" "	2777 G. 1	50.37	June 12
Roy No. 8	"	" "	2779 G. 1	49.14	Dec. 28
Samy Fraction	"	" "	5079 G. 1	38.17	Dec. 28
San Francisco	"	William Alexander Matheson	4985 G. 1	35.48	Dec. 28
Saskatchewan	"	Angus Alexander Crowston and Annie Lee Crowston	3846 G. 1	50.70	Sept. 17
Saxon Fraction	"	Britannia Mining & Smelting Co.	4996 G. 1	44.18	July 6
Severn	"	" "	5046 G. 1	51.65	Dec. 28
Shasta Fraction	"	" "	5063 G. 1	43.09	Dec. 28

VANCOUVER ISLAND AND COAST—*Continued.*

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Silver	Vancouver	James Archibald	2318 G. 1	51.65	Aug. 28
Skeena Fraction	"	Britannia Mining & Smelting Co.	2773 G. 1	43.93	Dec. 28
Spruce	"	George William Campbell and John Wilson Thornton, Executors and Administrators of the estate of Henry Cornwall Stewart, deceased, and William Barker, Robert Bruce Kirk, and Joel Chase Calhoun	5013 G. 1	32.79	Jan. 26
Taff	"	Britannia Mining & Smelting Co.	2775 G. 1	50.13	July 12
Tees	"	" "	2776 G. 1	51.51	July 12
Texas	"	" "	5062 G. 1	47.57	Dec. 28
Tay Fraction	"	" "	5009 G. 1	49.64	July 8
Thames	"	" "	5045 G. 1	49.54	Dec. 28
Tiber Fraction	"	" "	5054 G. 1	51.58	June 8
Tolmie	"	" "	4779 G. 1	51.38	Feb. 2
Top Fraction	"	" "	4658 G. 1	44.10	Feb. 5
Topaz	"	" "	4772 G. 1	51.65	Jan. 29
Toy Fraction	"	" "	4870 G. 1	42.97	Feb. 3
Trust Fraction	"	" "	4872 G. 1	51.32	Feb. 4
Utah	"	" "	5047 G. 1	51.59	Dec. 28
Venice Fraction	"	" "	5041 G. 1	34.77	Dec. 28
Vermont Fraction	"	" "	5053 G. 1	47.18	Dec. 28
Wallace Fraction	"	" "	2772 G. 1	44.09	June 12
Walter Fraction	"	" "	5006 G. 1	47.27	July 8
Warner Fraction	"	" "	5007 G. 1	45.45	July 12
Watkins Fraction	"	" "	5008 G. 1	45.24	July 8
Willard Fraction	"	" "	2788 G. 1	47.70	July 10
Wind	"	" "	4948 G. 1	51.65	Feb. 4
Winter	"	" "	5003 G. 1	51.65	July 9
Winton Fraction	"	" "	5043 G. 1	41.77	July 12
Yanky	"	" "	5077 G. 1	51.65	Dec. 28
Yew Fraction	"	" "	4033 G. 1	33.95	Jan. 20
York	"	" "	4231 G. 1	51.36	Jan. 20
Black Prince	Victoria	Joseph Dubois	149	40.94	May 17
Blue Grouse	"	Blue Grouse Mines, Ltd.	31G	48.41	April 30
Blue Grouse No. 2	"	"	32G	26.14	April 30
Blue Grouse No. 3	"	"	33G	51.58	April 30
Old Sport No. 17	Alberni	Coast Copper Co., Ltd	1503	47.50	Mar. 22
Old Sport No. 18 Fraction	"	"	1502	37.84	Mar. 22
Shamrock No. 11	"	"	1492	51.65	Mar. 22

DEPARTMENT OF MINES.

VICTORIA, B.C.

HON. WM. SLOAN, *Minister of Mines.*

R. F. TOLMIE, *Deputy Minister.*

WM. FLEET ROBERTSON, *Provincial Mineralogist and Assayer.*

JAS. MCGREGOR, *Chief Inspector of Mines.*

HENRY DEVLIN, *District Inspector*, Nanaimo.

T. R. JACKSON, *District Inspector*, Nanaimo.

ROBERT STRACHAN, *District Inspector*, Fernie.

JOHN MACDONALD, *District Inspector*, Fernie.

JOHN G. BIGGS, *District Inspector*, Merritt.

THOS. J. SHENTON, *District Inspector*, Prince Rupert.

H. H. JOHNSTONE, *Temporary Inspector*, Nelson.

A. G. LANGLEY, *Resident Engineer*, Revelstoke.

D. E. WHITTAKER, *Provincial Analyst and Assistant Assayer.*

J. D. GALLOWAY, *Resident Engineer*, Hazelton.

W. M. BREWER, *Resident Engineer*, Nanaimo.

GEO. A. CLOTHIER, *Resident Engineer*, Prince Rupert.

P. B. FREELAND, *Resident Engineer*, Grand Forks.

R. W. THOMSON, *Resident Engineer*, Kamloops.

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Atlin Mining Division	Atlin	J. A. Fraser	W. G. Paxton	
Sub-office	Telegraph Creek			H. W. Dodd.
"	Haines (U.S.)		(Com. for taking Affidavits)	Risdon M. Odell.
Stikine Mining Division	Telegraph Creek	H. W. Dodd	H. W. Dodd	
Sub-office	Boundary	"	"	John Cargill.
Liard Mining Division	Telegraph Creek	"	"	
Sub-office	Porter			Chas. H. Smith.
"	McDame Creek			Mike Larsen.
"	Fort St. John			F. W. Beatton.
Skeena Mining Division	Prince Rupert	J. H. McMullin	J. H. McMullin	
Sub-office	Alice Arm			Telka Carney.
"	Kitimat			Rev. S. S. Peat.
"	Port Simpson			J. R. C. Deane.
"	Swanson Bay			S. C. White.
"	Copper City			L. G. Skinner.
"	Terrace			L. H. Kenny.
"	Stewart (Portland Canal)			J. P. Scarlett (Acting).
Nass River	Anyox	J. H. McMullin	J. Conway (Acting).	
Portland Canal M.D.	Stewart	J. H. McMullin (at Prince Rupert)	J. P. Scarlett "	
Bella Coola Mining Div.	Prince Rupert	J. H. McMullin	J. H. McMullin	
Sub-office	Bella Coola			Brynild Brynildsen.
"	Bella Bella			John A. Pauline.
"	Ocean Falls			A. M. Tysom.
Queen Charlotte Min'g D.	Queen Charlotte	J. H. McMullin	John L. Barge	
Sub-office	Jedway			Isaac Thompson.
"	Masset			R. P. Ponder.
"	Lockeport			William Morgan.
Omineca Mining Division	Smithers	Stephen H. Hoskins	Jas. E. Kirby	
Sub-office	Fort Grahame			Einar Ursino.
"	Fort St. James			Alex. C. Murray.
"	Manson Creek			W. B. Steele.
"	Telkwa			T. J. Thorp.
"	Fort St. John			F. W. Beatton.

GOLD COMMISSIONERS AND MINING RECORDERS—*Continued.*

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Omineca M.D.—*Con.*				
Sub-office	Copper City			L. G. Skinner.
"	Terrace			L. H. Kenny.
"	Fort Fraser			Fred Fraser.
"	Junction Finlay &	Parsnip rivers		A. T. Sherwood.
"	Pacific			T. H. McCubbin.
"	Hazelton			Sperry Cline.
"	Burns Lake			L. Mulvaney.
"	Houston			W. J. Lutley.
"	Usk			Jas. L. Bethurum.
Peace River Mining Div.	Fort St. John	S. H. Hoskins	F. W. Beatton	
Sub-office	Hudson Hope	(at Hazelton)		John Gregg.
"	Pouce Coupe			J. D. Moore.
Cariboo Mining Division.	Barkerville	L. A. Dodd		
Sub-office	Quesnel	"		E. C. Lunn.
"	Fort George	"		T. W. Herne.
"	McBride	"		M. Gorman.
Quesnel Mining Division.	150-Mile House	L. A. Dodd	R. M. McGusty	R. M. McGusty.
Sub-office	Quesnel	(at Barkerville)		E. C. Lunn.
"	Quesnel Forks			Wm. Lowden.
"	Barkerville			L. A. Dodd.
Clinton Mining Division.	Clinton	Geo. Milburn		
Lillooet Mining Division.	Lillooet	John Dunlop	John Dunlop	
Kamloops Mining Division	Kamloops	E. Fisher	L. S. Brown	
Sub-office	Chu Chua			George Fennell.
"	Vavenby			Hyde Finley.
"	Albas			C. O. Sjouquist.
Ashcroft Mining Division.	Ashcroft	E. Fisher (at Kam.)	J. S. Alexander	
Sub-office	Lytton			Thos. Somerville.
Nicola Mining Division	Merritt	E. Fisher (at Kam.)	J. A. Murchison	
Yale Mining Division	Yale	" "	H. Beech	
Sub-office	Hope	" "		Wm. Greenwood.
Similkameen Mining Div.	Princeton	Hugh Hunter	Hugh Hunter	
Sub-office	Hedley			Jas. Clarke.
Vernon Mining Division.	Vernon	L. Norris	H. F. Wilmot	
Greenwood Mining Div.	Greenwood	W. R. Dewdney	W. R. Dewdney	
Sub-office	Vernon			H. F. Wilmot.
"	Rock Creek			Owen Wheeler.
"	Beaverdell			E. F. Ketchum.
Grand Forks Min. Div.	Grand Forks	S. R. Almond	S. R. Almond	
Osoyoos Mining Division.	Oliver	J. R. Brown		
Sub-office	Olalla			R. W. Northey.
"	Hedley			Jas. Clarke.
Golden Mining Division.	Golden	John Bulman	G. E. Sanborn	
Windermere Mining Div.	Wilmer	" (at Golden)	E. M. Sandilands	
Fort Steele Mining Div.	Cranbrook	N. S. A. Wallinger.		
Sub-office	Steele			Joseph Walsh.
"	Fernie			R. J. Stenson.
"	Moyie			W. H. Laird.
"				
Ainsworth Mining Div.	Kaslo	Ronald Hewat.	A. McQueen	A. W. Anderson.

GOLD COMMISSIONERS AND MINING RECORDERS—*Continued*

Mining Division.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Ainsworth M.D.—*Con.*				
Sub-office	Howser			W. Simpson.
"	Trout Lake			Oscar Jacobson.
"	Crawford Bay			Thos. W. Lytle.
"	Poplar			Arthur G. Johnston.
Slocan Mining Division	New Denver	Ronald Hewat	Angus McInnes	
Sub-office	Sandon	(at Kaslo)		W. J. Parham.
Slocan City Mining Div.	Slocan	Ronald Hewat	Thos. McNeish	
Trout Lake Mining Div.	Trout Lake	"	Oscar Jacobson	
Nelson Mining Division	Nelson	E. Ferguson (Actg.)	E. Ferguson (Actg.)	
Sub-office	Creston			R. Lamont.
"	Ymir			Wm. Dowling.
"	Sheep Creek			Geo. Leece.
"	Salmo			M. C. Donaldson.
Arrow Lake Min. Division	Nakusp	E. Ferguson	Walter Scott	
Sub-office	Vernon	(at Nelson)		H. F. Wilmot.
Revelstoke Mining Div.	Revelstoke	A. Johnson	J. Lee	Newton R. Brown.
Lardeau Mining Division	Beaton	" (at Revelstoke)	Ernest Roberts	
Trail Creek Mining Div.	Rossland	H. R. Townsend	M. S. Morrell	
Nanaimo Mining Division	Nanaimo	S. McB. Smith	S. McB. Smith	
Sub-office	Ladysmith			John Stewart.
"	Alert Bay			Ernest H. Robinson
"	Vananda			Leonard Raper.
"	Quathiaski Cove			S. Marshall.
"	Granite Bay			Henry Twidle.
"	Campbell River			T. W. Hanson.
Alberni Mining Division	Alberni	A. G. Freeze	A. G. Freeze	
Clayoquot Mining Division	Clayoquot	" (at Alberni)	W. T. Dawley	
Quatsino Mining Division	Quatsino	" "	Ed. Evensen	
Victoria Mining Division	Victoria	Herbert Stanton	Herbert Stanton	
New Westminster Min. D.	New Westminster	F. C. Campbell	I. Wintemute	
Sub-office	Harrison Lake			L. A. Agassiz.
"	Chilliwack			J. Pelly.
Vancouver Mining Div.	Vancouver	John Mahony	A. P. Grant	

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VICTORIA, B.C.:
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1921.

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British Columbia. *Bureau of Mines.*

Annual Report of the Minister of Mines for the year ending 31st December, 1920, being an account of mining operations for gold, coal, etc., in the Province. William Fleet Robertson, Provincial Mineralogist. 377 pp., plates, maps, 1920.
Victoria, Government Printing Office, 1921.

Series.

Robertson, William Fleet. *(Provincial Mineralogist.)*

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Victoria, Government Printing Office, 1921.

Subject.

FOURTH ANNUAL REPORT

OF THE

WORKMEN'S COMPENSATION BOARD

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Fourth Annual Report of the Workmen's Compensation Board of this Province is herewith respectfully submitted.

JOHN OLIVER,

Premier.

Premier's Office,

March 1st, 1921.

THE WORKMEN'S COMPENSATION BOARD,

VANCOUVER, B.C., February 26th, 1921.

The Honourable John Oliver, Premier,

Parliament Buildings, Victoria, B.C.

DEAR SIR,—In pursuance of section 50 of the "Workmen's Compensation Act," we enclose herewith Annual Report.

We are,

Yours very truly,

E. S. H. WINN,

Chairman.

REPORT *of*
WORKMEN'S COMPENSATION BOARD.

VANCOUVER, B.C., February 26th, 1921.

To the Lieutenant-Governor in Council,
Victoria, B.C.

SIR,—In accordance with the requirements of the "Workmen's Compensation Act," we submit our report for 1920, covering the fourth year's operation of the Act.

FINANCIAL—ASSESSMENTS AND AUDITS.

The increase in the industrial activity of the Province shown in 1919 was continued in the first nine months of 1920. For the last three months there was a decrease, principally in the lumber and metal industries. During 1920, 1,417 new firms were added to the list of employers, while 869 were cancelled, leaving a net increase of 548.

Notwithstanding the increased volume of business, the expense thereof was further reduced to 4.08 of the amount collected from employers. Of every $100 collected from the employer, $95.92 goes directly to the workmen or their dependents without any expense whatever to them.

The full basic rate of assessment was not charged in any of the classes. Class 2, covering wood-working plants, was abolished as and from December 31st, 1920, and the industries therein transferred to other classes. This was made necessary on account of the small pay-roll exposure.

Although the Act has been in operation four years, some employers are not yet familiar with the use of basic rates for assessment purposes. Each industry is given a rate having regard to the hazard which experience has shown is high enough to cover the cost of compensation for the year. This is known as the basic rate. The actual rate, however, depends on the number of assessments made to cover the cost of accidents in that class for the year. As this amount cannot be known in advance, assessments are made in each class as funds are required; each assessment being one-quarter of the annual estimated pay-roll multiplied by the basic rate. For example, the basic rate for sawmilling in Class 1 is 2.20, but the actual average rate for the past four years is 1.375, determined as follows:—

1917—Two assessments on two-fourths of pay-roll, actual rate	1.10
1918—Three assessments on three-fourths of pay-roll, actual rate	1.65
1919—Two assessments on two-fourths of pay-roll, actual rate	1.10
1920—Three assessments on three-fourths of pay-roll, actual rate	1.65
Four years' assessments amount to	5.50
Average rate	1.375

No new classes were created in 1920.

RESERVES.

In all cases where pensions have been awarded to dependents of workmen who have been killed, or pensions awarded to workmen whose injuries have resulted in permanent disability, the present value of the pensions for their expected term has been placed in reserve and the funds invested in Government securities in accordance with the requirements of the "Trustee Act," as is required by the "Workmen's Compensation Act." By this means the entire present and future cost of all accidents which happen in any year is borne by the employers who were engaged in industry in each of the several classes in that year. No burden therefore is thrown on the employers in future years on account of past accidents.

After four years' operation of the Act the reserves amount to $1,715,854.02. This amount includes an item of $15,000 per year (now amounting to $60,000) which has been set aside as a catastrophe reserve to protect against a possible catastrophe that may occur and which may not be attributable to or be a proper charge against any single class of industry.

The amount of the whole reserve may be expected to increase yearly until such time as the expiration of pensions occur as frequently as pensions are awarded. The investments are there-

fore made in as long-term bonds as are available for purchase. The funds of the reserve have to date been invested at a rate to yield an average of 5.93 per cent.

It is estimated that during the year 113,000 workmen were covered, with a pay-roll of $132,000,000.

STATEMENT OF THE CONDITION OF THE SEVERAL CLASSES ON DECEMBER 31ST, 1920, COVERING FIRST FOUR-YEAR PERIOD OF THE APPLICATION OF THE ACT.

Class.	Industries.	Received from Employers.	Refunds.	Compensation and Expense paid.	Reserve, Present Value of Pensions.	Balance in Class Funds.	Rates of Assessment. Proportion of Basic Rates Assessed.			
							1917.	1918.	1819.	1920.
1	Lumbering, sawmills shingle and lath mills, pulp and paper mills, creosoting-works, and logging-railways	$1,653,004 65	$ 2,386 53	$1,056,086 13	$ 621,541 51	$27,009 52*	2/4	3/4	2/4	3/4
2	Lighter forms of woodworking, planing-mills, sash and door factories, etc	87,239 28	15 95	54,656 86	38,998 28	6,431 81*	3/4	2/4	2/4	4/4
3	Coal-mining	681,243 30	.....	311,117 90	375,426 26	5,300 86*	4/4	3/4	2/4	3/4
4	Metal-mining, reduction of ores and smelting, quarrying, brick-manufacturing, etc	384,276 31	2,331 63	220,128 08	159,997 80	1,818 80	2/4	1/4	2/4	2/4
5	Iron and steel manufacturing, rolling-mills, iron or brass products, machine-shops, etc	111,001 76	504 20	64,730 19	34,824 78	10,942 59	2/4	2/4	1/4	3/4
6	Lighter forms of manufacture, paints, shoes, flour, power-laundries warehousing, etc	199,688 15	749 70	105,960 42	72,031 80	20,946 23	2/4	2/4	2/4	2/4
7	Building and construction generally, wooden- or steel-ship building, pile-driving, dredging, etc.	665,864 40	6,952 09	362,478 93	221,549 86	74,883 52	2/4	2/4	1/4	2/4
8	Electric light and power plants, N.E.S.; steam or electric railways, etc., N.E.S.; telephone or telegraph systems, N.E.S.; gasworks, N.E.S.; motion-picture machines, etc	146,992 92	83 44	72,612 69	68,577 04	5,719 75	2/4	1/4	2/4	1/4
9	Navigation, stevedoring, wharf operation	174,139 62	254 65	108,670 70	43,501 32	21,712 95	3/4	2/4	2/4	2/4
10	Canadian Pacific Rly. and Con. M. & S. Co. of Canada, Ltd., and their subsidiary companies	532,940 87	.....	204,255 05	313,658 16	15,027 66	2/4	2/4	2/4	2/4
11	Grand Trunk Pacific Rly. Co. and their subsidiary companies	28,322 20	.....	13,846 32	9,066 65	5,409 23	1/4	1/4	1/4	2/4
12	Canadian Northern Rly. Co. and their subsidiary companies	73,928 81	.....	31,163 41	32,779 75	9,985 65	2/4	1/4	2/4	4/4
13	British Columbia Government	124,580 62	.....	47,588 90	55,063 72	21,928 00	...	1/4	1/4	2/4
14	Municipalities	85,458 93	.....	26,444 89	39,047 31	19,966 73	...	2/4	1/4	1/4
15	Canning or packing fish, fishing, fish oil and fertilizer manufacturing, kelp-collecting	95,722 30	21 43	30,112 79	45,836 27	19,751 81	...	2/4	1/4	1/4
16	Explosives-manufacture, fireworks, fuses, chemicals, N.E.S.	38,376 73	.....	10,544 54	17,008 32	10,823 87	...	2/4	1/4	1/4
17	Retail employees (on request) and delivery	30,324 36	10 13	20,266 69	7,478 90	2,568 64	...	...	1/4	2/4
18	Great Northern Rly. Co. and their subsidiary companies	22,614 64	.....	7,835 90	8,335 13	6,443 61	...	...	2/4	3/4
19	Dominion Government	24,882 81	.....	4,140 05	14,404 73	6,338 03	...	...	1/4	1/4
	Totals	$5,160,602 66	$ 13,309 75	$ 2,752,640 44	$2,179,127 59	$215,524 88	...	...	...	...

* Indicates debit balance.

STATEMENT OF CONDITION OF ACCIDENT FUND ON JANUARY 1ST, 1921, COVERING 1917, 1918, 1919, AND 1920.

Receipts.

From employers, assessments		$5,160,602 66
From employers, medical aid		394,940 66
From workmen, medical-aid dues		625,979 35
From interest on investments		143,456 65
		$6,324,979 32

Disbursements.

Current—Compensation paid to workmen		$2,497,085 60
Refunds paid employers of overpayment of assessments		13,309 75
Medical Aid—Physicians, hospitals, drugs, etc.		1,018,212 40
Reserve—		
Pensions paid	$ 491,355 32	
Payments to dependents residing in Canada, made under Statute of 1919	115,374 90	
		606,730 22
Value, December 31st, 1920, of future payments of pensions on approved claims—		
Invested	$1,666,423 18	
Cash available for pensions, December 31st, 1920	49,430 84	
		1,715,854 02
Expense (four years)	$ 265,554 84	
Less paid by B.C. Government, February 5th, 1917	10,000 00	
		255,554 84
Cash on hand to credit of classes, December 31st, 1920		215,524 88
Cash on hand, December 31st, 1920, to credit of medical aid		2,707 61
		$6,324,979 32

STATEMENT OF CONDITION OF MEDICAL AID FUND ON DECEMBER 31ST, 1920, COVERING 1917, 1918, 1919, AND 1920.

Receipts.

Medical aid paid by workmen at 1 cent per day	$ 625,979 35
Share contributed by employers	394,940 66
	$1,020,920 01

Disbursements.

Physicians, hospital, drugs, etc.	$1,018,212 40
Balance on hand, December 31st, 1920	2,707 61
	$1,020,920 01

STATEMENT OF VOLUME OF BUSINESS FOR YEAR 1920 AND SHOWING CONDITION OF THE SEVERAL CLASSES ON DECEMBER 31ST, 1920.

Class.	Industries.	Balance at Dec. 31st, 1919.	Received from Employers, 1920 (including Interest).	Compensation Expense, and Refunds paid.	Transferred to Reserve.	Balance in Class Funds.	Rates of Assessment. Proportion of Basic Rates Assessed for 1920.	Rates of Assessment. Proportion of Basic Rates Assessed for 4 Yrs.
1	Lumbering, sawmills, shingle and lath mills, pulp and paper mills, creosoting-works, and logging-railways	$ 42,173 32*	$ 703,730 71	$ 444,649 16	$243,917 75	$ 27,009 52*	3/4	0.625
2	Lighter forms of wood-working, planing-mills, sash and door factories, etc	390 88	35,965 54	24,095 08	18,693 15	6,431 81*	4/4	0.687
3	Coal-mining	11,371 27*	212,811 78	105,635 03	100,906 34	5,300 86*	3/4	0.75
4	Metal-mining, reduction of ores and smelting, quarrying, brick-manufacturing, etc	1,030 48*	91,302 17	56,135 57	32,317 32	1,818 80	2/4	0.437
5	Iron and steel manufacturing, rolling-mills, iron or brass products, machine-shops, etc	13,987 35	42,615 47	22,325 85	23,334 38	10,942 59	3/4	0.50
6	Lighter forms of manufacture, paints, shoes, flour, power-laundries, warehousing, etc	4,098 71	50,879 71	28,478 45	5,553 74	20,946 23	2/4	0.50
7	Building and construction generally, wooden-or steel-ship building, pile-driving, dredging, etc	74,382 60	186,171 73	106,075 63	79,595 18	74,883 52	2/4	0.437
8	Electric light and power plants, N.E.S.; steam or electric railways, etc., N.E.S.; gasworks, N.E.S.; motion-picture machines, etc	6,571 57	22,783 72	12,868 99	10,766 55	5,719 75	1/4	0.375
9	Navigation, stevedoring, wharf operation	15,869 13	47,170 83	36,826 23	4,500 78	21,712 95	2/4	0.562
10	Canadian Pacific Rly. and Con. M. & S. Co. of Canada, Ltd., and their subsidiary companies	23,712 47	143,797 19	70,398 32	82,083 68	15,027 66	2/4	0.50
11	Grand Trunk Pacific Rly. Co. and their subsidiary companies	3,937 52	10,396 36	6,361 31	2,563 34	5,409 23	2/4	0.312
12	Canadian Northern Pacific Rly. Co. and their subsidiary companies	1,459 23*	41,574 37	12,732 04	17,397 45	9,985 65	4/4	0.562
13	British Columbia Government	15,122 10	66,018 44	33,902 34	25,310 20	21,928 00	2/4	0.333
14	Municipalities	5,960 31	25,801 87	11,251 68	543 77	19,966 73	1/4	0.333
15	Canning or packing fish, fishing, fish oil and fertilizer manufacturing, kelp-collecting	29,679 28	23,087 88	12,939 05	20,076 30	19,751 81	1/4	0.333
16	Explosives-manufacture, fireworks, fuses, chemicals, N.E.S	13,746 13	7,242 96	4,735 92	5,429 30	10,823 87	1/4	0.333
17	Retail employees (on request) and delivery	290 79	21,721 32	15,642 01	3,801 46	2,568 64	2/4	0.375
18	Great Northern Rly. Co. and their subsidiary companies	57 80	18,321 72	5,034 78	6,901 13	6,443 61	3/4	0.625
19	Dominion Government	8,710 76	15,485 30	3,511 55	14,346 48	6,338 03	1/4	0.25
	Totals	$160,283 10	$1,766,879 07	$1,013,598 99	$698,038 30	$215,524 88	...	...

* Indicates debit balance.

STATEMENT OF CONDITION OF ACCIDENT FUND ON DECEMBER 31ST, 1920, COVERING 1920.

Receipts.

Cash on hand, January 1st, 1920—		
To credit of classes	$ 160,283 10	
To credit of medical aid	402 58	
Available for pensions	21,332 96	
		$ 182,018 64
Collections during 1920—		
From employers, assessments and interest	$1,766,879 07	
From employers, medical aid	169,843 83	
From interest on reserve investments	67,830 78	
From workmen, medical-aid dues	229,912 14	
		2,234,465 82
		$2,416,484 46

Disbursements.

Current—Compensation paid to workmen		$ 929,914 63
Refunds paid employers of overpayment of assesments		1,878 32
Medical Aid—Physicians, hospitals, drugs, etc.		397,450 94
Reserve—		
Pensions paid	$ 233,621 78	
Payments to dependents residing in Canada, made under Statute of 1919	49,504 39	
		283,126 17
Value, December 31st, 1920, of future payments of pensions on claims approved during 1920—		
Invested	$ 454,645 03	
Cash available for pensions, December 31st, 1920	49,430 84	
		504,075 87
Expense		81,806 04
Balance to credit of classes, December 31st, 1920		215,524 88
Cash on hand to credit of medical aid, December 31st, 1920		2,707 61
		$2,416,484 46

STATEMENT OF CONDITION OF MEDICAL AID FUND ON DECEMBER 31ST, 1920, COVERING 1920.

Receipts.

Balance to credit of medical aid, December 31st, 1919	$ 402 58
Medical aid paid by workmen at 1 cent per day during 1920	229,912 14
Share contributed by employers during 1920	169,843 83
	$ 400,158 55

Disbursements.

Physicians, hospitals, drugs, etc.	$ 397,450 94
Balance on hand, December 31st, 1920	2,707 61
	$ 400,158 55

BALANCE-SHEET AS AT DECEMBER 31ST, 1920.

	Assets.	Liabilities.
Reserve investments—		
British Columbia Government and Dominion Government Bonds and Pacific Great Eastern 4½% Debenture Stock guaranteed by the British Columbia Government: Par value, $1,847,764.30; cost value	$1,666,423 18	
Cash—		
Current Account, December 31st, 1920	215,524 88	
Medical Aid Account, December 31st, 1920	2,707 61	
Reserve Account, December 31st, 1920	49,430 84	
Reserve—		
Value, December 31st, 1920, of future payments of pensions on approved claims	.....	$1,715,854 02
Reserve and interest $1,998,980 19		
Less pensions and bonus paid 283,126 17		
Reserve value, December 31st, 1920 $1,715,854 02		
At credit of classes, December 31st, 1920, to pay claims not yet allowed	.....	215,524 88
At credit of medical aid, December 31st, 1920, to pay bills not yet allowed	.....	2,707 61
	$1,934,086 51	$1,934,086 51

STATEMENT OF CONDITION OF THE RESERVE FUND ON DECEMBER 31ST, 1920, COVERING 1920.

Balance to credit of reserve, December 31st, 1919		$1,233,111 11
Present value of pensions approved during 1920		698,038 30
Interest on invested reserve		67,830 78
		$1,998,980 19
Pensions paid during 1920	$ 233,621 78	
Payments to dependents residing in Canada made under Statute of 1919	49,504 39	
		283,126 17
Present value of future payments on approved claims, December 31st, 1920		$1,715,854 02
Invested—		
Total investments up to December 31st, 1919 (par value $1,335,000), cost value	$1,211,778 15	
Invested during 1920—		
20-year 5% Debenture Bond, B.C. Government, to earn 5.5% (par value $100,000), cost value	93,980 00	
15-year 5½% Victory Loan, due in 1934	240,000 00	
Pacific Great Eastern 4½% Debenture Stock at price to earn 7.4% (par value $172,764.30), cost value	120,665 03	
Purchase price of bonds		$1,666,423 18
Cash on hand, Reserve Account, December 31st, 1920		49,430 84
Cash and investments on hand, December 31st, 1920		$1,715,854 02

Average rate of interest on cost of bonds, 5.93%.

CLAIMS.

During the year 1920 20,905 accidents were reported, of which 20,689 were non-fatal and 216 were fatal. This number does not include several thousand trivial accidents in which first-aid service only was rendered, and in which there was no doctor required or time lost and no claim made.

One of the encouraging features of the year's operation was that a fewer number of fatal cases were reported than during any year since the Act came into force. Of the 216 fatal accidents, 205 of them occurred during 1920 and 11 occurred late in 1919, but were not reported until the beginning of 1920. Even with the increase in the total number of workmen engaged in industries within the scope of the Act, there were less fatal accidents than in any of the three preceding years. During 1919 there were 277 fatal accidents reported; in 1918 there were 240 and in 1917 there were 217 fatalities, or an average of 237 for the four years.

Since the present Act came into effect on January 1st, 1917, a total of 74,323 non-fatal claims have been filed and 950 fatal accidents reported. Arising out of the fatal accidents, pensions have been granted in 440 cases to dependents. There is now a total of 1,326 persons receiving monthly pension cheques resulting from the fatalities of the four years.

By reason of thirty-four widows of deceased workmen having remarried and been paid the statutory allowance of $480, further payments to them have ceased. Pensions, however, in respect to the children of the first marriage continue until such children reach the age of 16 years.

Under the 1920 amendments to the Act, widows of workmen fatally injured by accident in 1920 are each paid $35 per month and $7.50 per month for each child. Formerly the pension to each widow was $20 per month and $5 per month for each child under 16 years, with a special statutory provision for payment of the balance up to the amount of $35 per month for widows and $7.50 per month for each child residing in Canada. This statutory bonus payment was made semi-annually from a contingent fund furnished through a provision of the 1919 amendments to

the Act. The system of the semi-annual bonuses has continued in respect to widows residing in Canada whose husbands met their death prior to 1920. The sum of $49,504.39 has been paid during the year from the fund created by the revised scale of pensions payable to dependents residing in foreign countries where the cost of living is considerably lower than it is in Canada. The result has been that the pensions paid to widows and children residing in Canada have in all cases reached the sum of $35 per month per widow and $7.50 per month for each child.

With the increased activity in connection with many of the important industries of the Province, particularly that of lumbering, a larger number of men have been engaged in hazardous occupations than has been the case in previous years. This increased demand for labour has been chiefly met by the return of our men from overseas; the year 1920 was the first full year in which the returned men have been re-establishing themselves in industry. The reconstruction period also had the effect of closing or curtailing some industries and enlarging some others, with the result that a great many men found themselves in new occupations, with which they were not entirely familiar. Notwithstanding this condition of unfamiliarity, which is a frequent cause of accidents, the total number of accidents has not been increased as might have been expected.

The provisions of the Act are now fairly well understood by the vast majority of workmen, with the result that many accidents which in the early years of the Act were not reported are now being reported and claims being made in respect of same.

The campaign for more efficient first-aid service and the importance of prompt medical attention has decreased the distressing effects arising from neglected injuries which so often in other days led to blood-poisoning and to serious permanent partial disability. The importance of first aid and medical service and its proper use is becoming more generally appreciated by both workmen and employers.

There were 505 claims made, which for various reasons were not allowed; some of these were made by members of the employing firms who had not previous to the accident made application for the extension of the benefits of the Act to them. Others were made by workmen suffering from various disabilities which were not the result of accident and for which there was no authority to compensate. The number of such claims is less than 2½ per cent. of the total.

During the year 11,166 workmen received compensation in respect of time loss. Of the non-fatal accidents, 7,844 were such as did not necessitate a longer time loss than three days. Medical aid, however, was paid in respect of same.

As no application for compensation was made within one year from the date of accident, 1,242 claims in respect of accidents happening prior to January 1st, 1920, lapsed during the year by the expiry of the statutory time limit. All of these were cases in which from one to four days' compensation might have been paid had the workmen filed an application therefor.

During the year there was a daily average of 70 accidents reported, making an average of 1,742 claims for each month of the year. With the falling-off of activities in some industries during the latter part of the year, the number of accidents decreased, and for the month of December only 1,501 claims were filed.

When the year 1920 ended there were only 1,001 claims which were not sufficiently complete to be dealt with. These accidents were mainly those which were reported during the last two or three weeks of the year, and the data in respect of medical treatment and time loss had not been received, or not sufficient time had elapsed to warrant a cheque being issued on account. In addition to this number, 451 other claims had not been finally disposed of, although the injured workmen had received one or more payments in respect of time loss which was continuing into the new year.

The total amount paid on claims during the year was $1,711,637.29, being 23 per cent. more than 1919. This was due mainly to the increased volume of business and the increase in widows' allowances of 75 per cent., children's allowances of 50 per cent., and other dependents of 50 per cent.

A total of 40,276 cheques were issued during the year to workmen, dependents, and in respect of medical aid.

The increased promptness of adjustment has been made possible by claimants, doctors, and employers having a greater knowledge of the Act. The result has been that at no time since the Board commenced operation has there been a smaller number of unfinished claims to carry into the new year.

PERMANENT PARTIAL DISABILITY.

The same methods as to rehabilitation as were outlined in the Second Annual Report were continued during 1920.

RE-EMPLOYMENT.

Every effort is made to find employment for the injured workman where he is unable by reason of his particular disability to return to the old employment. The workman's employer invariably co-operates with the Board in this effort.

ACCIDENT-PREVENTION.

The campaign on behalf of accident-prevention is being waged with undiminished vigour, and to-day all operations having over fifty workmen have Safety Committees whose efforts are being continually directed in the interests of personal safety to all concerned. The artificial safeguarding of dangerous machinery keeps on in a satisfactory manner and more machines are so safeguarded to-day than at any time since the accident-prevention campaign began.

MEDICAL DIVISION.

The amended First-aid Service regulations which became effective September 1st, 1920, are being generally observed by employers, and where not observed are enforced. Their beneficial effects in preventing serious infections and providing prompt and efficient first-aid attention when required is unquestioned. The general result is that the workman is saved time loss, the employer's class the compensation, and medical, hospital, nursing, and drug cost.

Inasmuch as the regulations require the employer at his own expense to provide this first-aid service, it in turn requires the workmen to forthwith report all trivial injuries to that first-aid service department, so that by prompt attention a more serious condition may be prevented. Failure on the workman's part to avail himself of this service, whereby consequences arise which could have been provided against by first-aid attention, may have the effect of jeopardizing payment of compensation. It is quite evident that this service cannot be effectual unless advantage is taken of it. During the year there has been disbursed for medical, surgical, and hospital treatment, transportation, nursing, medicine, crutches, apparatus, and artificial members for injured workmen the sum of $397,450.94. For the past four years the total amount disbursed for medical aid for injured workmen was the sum of $1,018,212.40. The disbursement of these amounts forces the realization of the necessity of the medical-aid clauses in this class of legislation. The medical, surgical, and hospital costs during the past six months have considerably increased; the medical and surgical schedule of fees by approximately 30 per cent. and the hospital by 25 per cent.

With a very few exceptions there has been a most harmonius feeling between the members of the medical profession, the hospitals, and the Board. This good feeling has very materially assisted in the success of the Act.

STATISTICAL.

The following tables deal only with accidents finalled during 1920 where time loss was allowed. These did not all occur during that year, and on the other hand a number of accidents occurring in 1920 are not included, since they have not yet been finally disposed of by final payment. The information collected is analysed in the three primary classifications:—

(1.) Industry:
(2.) Cause:
(3.) Nature of injury.

Table A deals with each industry separately, showing the injury sustained, how it commenced, permanent partial disability, temporary total and fatal cases.

Table A 1 is a summary of Table A.

Table B shows the various accidents in the different classes in the following details:—

(1.) Industry:
(2.) Workman's total wage loss:
(3.) Average daily wage on day of accident:
(4.) Sex:
(5.) Conjugal state:

(6.) Average age:
(7.) Whether workman was receiving other benefits:
(8.) Nationality.

Attention is directed to the small percentage of workmen who received benefits other than those under this Act.

Table B 1 is a summary of Table B.

Table C shows the causes of various accidents dealt with and the amounts paid for time loss, permanent partial diability accidents and fatals, together with the cost of same. This table is important in that it shows the reason for such accidents and aids materially in accident-prevention work.

Table D shows the various parts of the workman's body which were injured in 11,166 temporary total disability accidents, the classes of industry in which they occurred, the nature of the injury, and the amount paid according to the part of the body injured.

Table E covers permanent partial disability cases finalled in 1920. These are shown according to the nature of the injury, the class of industry in which they occurred, the total cost, and the average amount paid for each part of the body injured.

Table F is a severity table and shows the loss of time in each case and also in each class. It will be noted that the average duration of disability is 30.3 days. During the year 1920 11,166 temporary total disability claims were finally disposed of, on which the wage loss amounted to $1,545,956.66, for which the workmen received $716,481.87 as compensation, being 46 per cent. of the wage loss. This rate of percentage is due to the fact that the first three days of the workman's disability are not compensable. The average weekly wage for 1919 was $22.16; that of 1920 cannot be ascertained until all pay-rolls of employers operating in 1920 are audited.

The average cost of finalled fatal cases for 1920 was $5,144.48, and for 1919 $3,526.09. This increase is particularly due to the increase in the benefits received by widows and children and other dependents.

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1920.

Sub-class.	Industry.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
				CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
		No. of Claims.	Amount of compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
	Class No. 1.														
1	Creosoting-works	12	$ 1,291 77	1	$ 190 93	....	.....	1	$ 190 93	...	.....	....	.....	.....	$ 1,482 70
2	Lath-mills, including yards and delivery	22	928 75	2	447 21	1	$ 195 13	2	672 34	1	$ 5,486 49	....	.....	$ 5,486 49	7,087 58
3	Lumbering, including logging, river-driving, rafting, or booming	2,400	176,048 76	70	18,727 13	30	39,523 96	72	58,251 09	12	63,213 36	48	$ 3,546 02	66,759 38	301,059 23
4	Pulp and paper manufacturing	282	13,073 76	10	2,088 10	2	861 38	10	2,949 48	3	13,683 45	5	363 85	14,047 30	30,070 54
5	Saw mills, including yards and delivery	1,462	83,198 23	88	30,761 09	30	32,248 19	88	63,009 28	9	53,654 34	16	1,202 00	54,856 34	201,063 85
6	Shingle-mills, including yards and delivery	396	25,940 30	53	8,871 27	13	10,698 46	53	19,569 73	1	4,205 12	3	225 00	4,430 12	49,940 15
7	Logging-railways (operation, construction, and maintenance)	137	10,592 34	9	6,061 63	....	.....	9	6,061 63	3	9,894 18	8	600 00	10,494 18	27,148 15
		4,711	$311,073 91	233	$67,177 36	76	$83,527 12	235	$150,704 48	29	$150,136 94	90	$ 5,936 87	$156,073 81	$617,852 20
	Class No. 2.														
4	Broom and mop manufacturing	4	$ 26 92	....	.....	....	.....	....	.....	....	.....	....	.....	.....	$ 26 92
5	Carpentering (shop only)	2	88 60	....	.....	....	.....	....	.....	....	.....	....	.....	.....	88 60
6	Coffins, wooden, manufacturing	4	45 93	....	.....	....	.....	....	.....	....	.....	....	.....	.....	45 93
7	Cooperage (no stave or head manufacturing)	11	466 94	3	$ 532 04	....	.....	3	$ 532 04	....	.....	....	.....	.....	998 98
8	Veneer and excelsior manufacturing	8	135 12	....	.....	....	.....	....	.....	....	.....	....	.....	.....	135 12
9	Furniture-manufacturing	20	607 20	1	250 09	....	.....	1	250 09	....	.....	....	.....	.....	857 29
11	Pail and tub manufacturing	1	8 66	....	.....	....	.....	....	.....	....	.....	....	.....	.....	8 66
12	Picture-framing	1	25 50	....	.....	....	.....	....	.....	....	.....	....	.....	.....	25 50
13	Wood-working plants, planing-mills	139	6,897 57	15	3,407 80	4	$ 2,908 89	15	6,316 69	....	.....	....	.....	.....	13,214 26
14	Sashes and door manufacturing	30	1,587 29	4	1,266 00	2	1,945 46	4	3,211 46	....	.....	....	.....	.....	4,798 75
16	Vehicle-manufacturing	5	375 93	2	303 74	....	.....	2	303 74	....	.....	....	.....	.....	679 67
17	Wooden-box manufacturing	90	3,312 95	7	1,352 94	2	4,585 42	9	5,938 36	....	.....	....	.....	.....	9,251 31
19	Lumber-yards (operation not connected with mills)	2	263 18	...	.....	....	.....	....	.....	....	.....	....	.....	.....	263 18
20	Spokes, staves, and heads manufacturing	7	336 43	1	48 03	....	.....	1	48 03	....	$ 7,681 79	....	.....	$ 7,681 79	8,066 25
21	Wood-toy manufacturing	6	223 08	2	408 12	1	478 57	2	886 69	....	.....	....	.....	.....	1,109 77
		330	$ 14,401 30	35	$ 7,568 76	9	$ 9,918 34	37	$ 17,487 10	1	$ 7,681 79	....	.....	$ 7,681 79	$ 39,570 19
	Class No. 3.														
1	Coal-mining	1,039	$ 82,426 55	35	$14,809 48	15	$25,267 65	36	$ 40,077 13	12	$ 75,835 01	17	$ 1,275 00	$ 77,110 01	$199,613 69
	Class No. 4.														
2	Cement-manufacturing (factory only)	2	$ 265 37	....	.....	....	.....	....	.....	....	.....	....	.....	.....	$ 265 37
4	Sand, shale, clay, and gravel pits	6	127 79	....	.....	....	.....	....	.....	....	.....	....	.....	.....	127 79
10A	Lime-kilns (with quarry)	3	474 24	....	.....	....	.....	....	.....	....	.....	....	.....	.....	474 24
11	Metal-mining	520	39,112 30	32	$ 7,633 22	14	$25,214 76	33	$ 32,847 98	2	$ 6,056 08	8	$ 600 00	$ 6,656 08	$ 78,616 36
12	Monuments, lettering or setting	2	68 86	....	.....	....	.....	....	.....	....	.....	....	.....	.....	68 86
13	Quarrying	14	973 34	1	396 72	....	.....	1	396 72	....	.....	....	.....	.....	1,370 06
15	Stone dressing or cutting	6	274 27	....	.....	....	.....	....	.....	....	.....	....	.....	.....	274 27
16	Reduction of ores and smelting	62	2,612 37	....	.....	....	.....	....	.....	1	652 62	1	75 00	727 62	3,339 99

17	Brick-manufacturing, including clay-digging operations	6	80 79	....	.....	....	.....	....	.....	....	.....	....	.....	.....	80 79
17A	Brick manufacturing (no clay-digging operations)	1	29 57	....	.....	....	.....	....	.....	....	.....	....	.....	.....	29 57
	Class No. 5.	622	$ 44,018 90	33	$ 8,029 94	14	$25,214 76	34	$33,244 70	3	$ 6,708 70	9	$ 675 00	$ 7,383 70	$ 84,647 30
1	Auto-repairing	91	$ 3,501 71	5	$ 683 94	1	$ 651 83	5	$ 1,335 77	....	.....	...	.....	.....	$ 4,837 48
3	Blacksmith-shops	18	747 97	1	350 00	1	836 91	1	1,186 91	....	.....	....	.....	.....	1,934 88
3A	Horse-shoeing	1	13 75	....	.....	....	.....	....	.....	....	.....	...	.....	.....	13 75
4	Nuts, bolts, nails, and spikes manufacturing (cold process)	5	489 24	1	218 13	1	921 19	1	1,139 32	....	.....	....	.....	.....	1,628 56
5	Nuts, bolts, nails, and spikes manufacturing (hot process)	1	27 17	1	50 25	....	.....	1	50 25	....	.....	....	.....	.....	77 42
6	Can-manufacturing (no hand-feed stamping)	8	152 29	....	.....	....	.....	....	.....	....	.....	....	.....	.....	152 29
7	Can-manufacturing (hand-feed stamping)	20	598 96	3	162 84	....	.....	3	162 84	....	.....	....	.....	.....	761 80
8A	Boiler-manufacturing	34	1,267 46	2	336 47	....	.....	2	336 47	....	.....	....	.....	.....	1,603 93
8B	Engine-manufacturing	4	125 47	....	.....	....	.....	....	.....	....	.....	....	.....	.....	125 47
9	Iron and steel foundry	44	1,830 32	1	250 00	1	478 57	1	728 57	....	.....	....	.....	.....	2,558 89
10	Stove and furnace manufacturing and installation	3	71 23	....	.....	....	.....	....	.....	....	.....	....	.....	.....	71 23
11	Machine-shops	75	2,833 00	3	353 42	1	478 57	3	831 99	1	$ 7,513 28	1	$ 75 00	$ 7,588 28	11,253 27
12	Iron, steel, and metal-products manufacturing (N.E.S.)	24	1,304 29	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,304 29
12A	Iron and steel manufacturing (N.E.S.)	3	112 99	1	158 45	....	.....	1	158 45	....	.....	....	.....	.....	271 44
13	Metalware (small) manufacturing	2	12 76	....	.....	....	.....	....	.....	....	.....	....	.....	.....	12 76
14	Ornamental-iron works (shop only)	1	75 25	....	.....	....	.....	....	.....	....	.....	....	.....	.....	75 25
15	Rolling-mills	8	153 65	....	.....	....	.....	....	.....	....	.....	....	.....	.....	153 65
16	Sheet-metal works (construction, erection, and repair)	19	1,216 37	3	752 78	....	.....	3	752 78	....	.....	....	.....	.....	1,969 15
17	Fabrication of structural steel, iron, or metal	2	449 90	....	.....	....	.....	....	.....	....	.....	....	.....	.....	449 90
18	Acetylene welding	....	.....	....	.....	....	.....	....	.....	1	6,001 07	1	75 00	6,076 07	6,076 07
19	Acetylene gas manufacturing	1	14 85	....	.....	....	.....	....	.....	1	6,071 15	1	75 00	6,146 15	6,161 00
	Class No. 6.	364	$ 14,998 63	21	$ 3,316 28	5	$ 3,367 07	21	$ 6,683 35	3	$19,585 50	3	$ 225 00	$19,810 50	$ 41,492 48
1	Tent and awning manufacturing	2	$ 122 20	....	.....	...	.....	....	.....	....	.....	....	.....	.....	$ 122 20
2A	Bakeries (with delivery)	15	1,233 00	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,233 00
2B	Bakeries (no delivery)	1	57 06	....	.....	....	.....	....	.....	....	.....	....	.....	.....	57 06
3	Confectionery-manufacturing	14	163 91	1	$ 302 11	....	.....	1	$ 302 11	....	.....	....	.....	.....	466 02
3A	Biscuit-manufacturing	6	230 08	2	670 41	1	$ 1,330 54	2	2,000 95	....	.....	....	.....	.....	2,231 03
4	Liquors and beverages manufacturing, including bottling and delivery	44	2,440 69	3	3,242 20	1	385 60	3	3,627 80	....	.....	....	.....	.....	6,068 49
5	Butcher-shops (without delivery)	48	1,337 43	5	440 07	....	.....	5	440 07	....	.....	1	$ 75 00	$ 75 00	1,852 50
6	Steam-heating plants (N.E.S.)	3	120 85	....	.....	....	.....	....	.....	....	.....	....	.....	.....	120 85
7	Canning and packing fruits or vegetables	42	936 14	....	.....	....	.....	....	.....	....	.....	....	.....	.....	936 14
8	Nitrogen products	4	84 01	....	.....	....	.....	...	.....	....	.....	....	.....	.....	84 01
9	Compounds (N.E.S.) manufacturing	4	131 29	....	.....	....	.....	....	.....	....	.....	....	.....	.....	131 29
11	Cleaning and dyeing	1	25 00	1	37 92	....	.....	1	37 92	....	.....	....	.....	.....	62 92
12	Cloth, textiles, or clothing manufacturing	7	624 68	....	.....	....	.....	....	.....	....	.....	....	.....	.....	624 68
13	Hotel and hospital employees	4	150 91	....	.....	....	.....	....	.....	....	.....	....	.....	.....	150 91
14	Cold-storage plants (no teaming)	1	63 43	....	.....	....	.....	....	.....	....	.....	....	.....	.....	63 43
15	Cold-storage plants (with teaming)	4	124 17	....	.....	....	.....	....	.....	....	.....	....	.....	.....	124 17
16	Creameries, including delivery	38	2,216 13	4	1,027 12	1	1,170 01	4	2,197 13	....	.....	....	.....	.....	4,413 26
18	Elevators (operation)	3	120 36	....	.....	....	.....	....	.....	....	.....	....	.....	.....	120 36
20	Surveying	1	23 10	....	.....	....	.....	....	.....	....	.....	....	.....	.....	23 10
21	Flour-milling	14	500 83	....	.....	....	.....	....	.....	....	.....	....	.....	.....	500 83
22	Food-products manufacturing (N.E.S.)	36	1,205 81	1	237 90	1	474 85	1	712 75	....	.....	...	.....	.....	1,918 56
23	Handling of grain	11	160 79	....	.....	....	.....	....	.....	....	.....	....	.....	.....	160 79
24	Silver-plating, bevelling, and leaded glass	1	68 75	....	.....	....	.....	....	.....	....	.....	....	.....	.....	68 75
	Carried forward														

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1920—*Continued.*

Sub-class.	Industry.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
				CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
		No. of Claims.	Amount of compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
	Brought forward	..	.....	....	....	....	.....	....	.....	....	.....	....	.....	....	....
	Class No. 6—Continued.														
25	Glass manufacturing and repairing	2	20 30	...	.....	....	.....	....	.....	....	.....	....	.....	.....	20 30
26	Ice-manufacturing (with delivery)	3	33 33	....	.....	....	.....	....	.....	....	.....	....	.....	.....	33 33
27	Janitors (on request)	7	342 74	....	.....	....	.....	....	.....	....	.....	....	.....	.....	342 74
29	Knitting-mills	2	34 25	1	104 95	....	.....	1	104 95	....	.....	....	.....	.....	139 20
31	Laundries (power)	29	822 09	...	.....	....	... .	....	.....	....	.....	....	.....	.....	822 09
33	Leather-shoes manufacturing or repairing	8	156 54	....	.....	....	.....	....	.....	....	.....	....	.....	.....	156 54
34	Leather-goods manufacturing	2	153 21	...	.....	....	.....	....	.....	....	.....	....	.....	.....	153 21
36	Oil refining and distribution	13	614 77	....	.....	....	.....	...	.....	....	.....	....	.....	.....	614 77
37	Packing-houses (slaughtering, with or without teaming)	48	1,083 50	1	107 23	....	.....	1	107 23	....	.....	....	.....	.....	1,190 73
38	Packing-houses (slaughtering, with teaming)	10	295 78	....	.....	....	.....	....	.....	....	.....	....	.....	.....	295 78
39	Paint-manufacturing	7	1,007 69	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,007 69
40	Tar, tarred, pitched, or asphalted paper manufacturing	5	398 23	....	.....	....	....	....	.....	....	.....	....	.....	.....	398 23
41	Printing, lithographing, and engraving	21	782 16	2	230 25	....	.....	1	230 25	....	.....	....	.....	.....	1,012 41
42	Rubber or rubber-goods manufacturing	6	264 71	....	.....	....	.....	....	.....	....	.....	....	.....	.....	264 71
43	Stationery-manufacturing	5	67 75	....	.....	....	.....	....	.....	....	.....	....	.....	... .	67 75
44	Upholstering	2	31 17	....	.....	....	.....	....	.....	....	.....	....	.....	.....	31 17
		474	$ 18,248 84	21	$ 6,400 16	4	$ 3,361 00	21	$ 9,761 16	....	.....	1	$ 75 00	$ 75 00	$ 28,085 00
	Class 7.														
2	Bridge-building (steel)	2	$ 128 98	....	.....	....	.....	....	.....	....	.....	....	.....	.....	$ 128 98
3	Bridge-building (wooden)	15	1,232 12	1	$ 67 90	....	.....	1	$ 67 90	....	.....	....	.....	.....	1,300 02
4	Building construction (N.E.S.)	195	12,301 13	8	1,996 42	4	$ 2,144 68	8	4,141 10	3	$17,610 90	6	$ 450 00	$18,060 90	34,503 13
5	Structural carpentry	38	1,686 05	1	138 55	....	.....	1	138 55	2	11,454 61	....	.....	11,454 61	13,279 21
6	Reservoirs, dams, or flumes (construction with blast)	1	96 25	....	.....	....	.....	....	.....	....	.....	....	.....	.....	96 25
7	Reservoirs, dams, or flumes (construction without blast)	1	48 40	....	.....	....	.....	....	.....	....	.....	....	.....	.....	48 40
8	Dredging	31	2,076 45	1	394 71	1	748 43	1	1,143 14	1	6,772 17	....	.....	6,772 17	9,991 76
9	Dry-docks, construction of	3	26 55	...	.....	....	.....	....	.....	....	.....	....	.....	.....	26 55
10	Electric wiring of buildings	15	571 27	....	.....	....	.....	....	.....	....	.....	....	.....	.....	571 27
11	Steam-railways (construction and operation)	255	15,176 27	6	1,020 87	1	1,483 41	6	2,504 28	2	11,854 65	4	300 00	12,154 65	29,835 20
12	Floor-laying (mosaic, tile, or terrazzo)	3	200 06	....	.....	....	.....	....	.....	....	.....	....	.....	.....	200 06
14	Plumbing and heating	30	1,128 41	1	82 59	....	.....	1	82 59	....	.....	....	.....	.....	1,211 00
15	House-moving	4	78 43	.....	.....	....	.....	....	.....	....	.....	....	.....	.....	78 43
15A	House-wrecking	7	437 28	...	.....	....	.....	....	.....	1	2,678 48	....	.....	2,678 48	3,115 76
16	Installation of boilers, engines, machinery, marine elevators, iron stairs, etc.	8	935 55	1	230 64	....	.....	1	230 64	....	.....	....	.....	.....	1,170 19
16A	Removing of boilers, etc	1	136 95	....	....	....	... .	....	.....	....	.....	....	.....	.....	136 95
17	Installation of elevators	1	27 02	....	.....	....	.....	....	.....	....	.....	....	.....	.....	27 02
18	Irrigation-works, construction of	17	938 84	1	80 31	....	.....	1	80 31	....	.....	....	.....	.....	1,019 15

20A	Marine-railway operation, including repair of vessels not exceeding 50 tons weight	2	168 71	....	.....	....	.....	....	.....	....	.....	....	.....	.....	168 71
20B	Marine-railway operation, including repair of vessels exceeding 50 tons weight	26	2,244 20	1	143 25	....	.....	1	143 25	....	.....	....	.....	.....	2,387 45
21	Mason-work	2	241 73	1	800 00	....	.....	1	800 00	....	.....	....	.....	.....	1,041 73
22	Painting	8	724 03	....	.....	....	.....	....	.....	....	.....	....	.....	.....	724 03
23	Painting high steel or other structures	4	365 38	....	.....	....	.....	....	.....	....	.....	....	.....	.....	365 38
25	Pier-construction	6	228 57	....	.....	....	.....	....	.....	....	.....	....	.....	.....	228 57
26	Pile-driving	26	1,984 04	3	408 06	....	.....	3	408 06	....	.....	1	75 00	75 00	2,467 10
27	Plastering	6	137 35	....	.....	....	.....	....	.....	....	.....	....	.....	.....	137 35
28	Reinforced-concrete erection	1	10 89	....	.....	....	.....	....	.....	....	.....	....	.....	.....	10 89
29	Road-making (with blasting)	9	231 49	1	1,000 00	....	.....	1	1,000 00	1	3,409 92	2	150 00	3,559 92	4,791 41
30	Road-making (without blasting)	15	635 88	1	49 22	....	.....	1	49 22	....	.....	....	.....	.....	685 10
31	Roofing	5	220 33	....	.....	....	.....	....	.....	....	.....	1	75 00	75 00	295 33
32	Street-cleaning or scavenging	0	11 55	....	.....	....	.....	....	.....	....	.....	....	.....	.....	11 55
34	Sewers (operation and maintenance, including new connections)	1	13 20	....	.....	....	.....	....	.....	....	.....	....	.....	.....	13 20
35	Sewers (new construction or extension of plant)	3	34 35	....	.....	....	.....	....	.....	....	.....	....	.....	.....	34 35
36	Sheet-metal erection	4	491 92	....	.....	....	.....	....	.....	....	.....	....	.....	.....	491 92
39	Steel-ship building	575	24,651 36	19	2,230 52	1	659 92	19	2,890 44	2	8,525 65	2	150 00	8,675 65	36,217 45
41	Tunnelling or well-digging	1	38 36	....	.....	....	.....	....	.....	....	.....	....	.....	.....	38 36
41A	Excavations (N.E.S.)	3	137 51	....	.....	....	.....	....	.....	....	.....	....	.....	.....	137 51
42	Waterworks construction or extension of plant	2	80 54	....	.....	....	.....	....	.....	....	.....	....	.....	.....	80 54
44	Waterworks operation and maintenance, including new connections	2	11 24	....	.....	....	.....	....	.....	....	.....	....	.....	.....	11 24
45	Well-drilling	3	191 69	....	.....	....	.....	....	.....	....	.....	....	.....	.....	191 69
48	Wooden-ship construction	80	9,215 83	15	4,910 18	5	3,359 31	15	8,269 49	1	2,002 42	2	150 00	2,152 42	19,637 74
49	Boat-manufacturing (less than 50 tons weight)	22	1,546 72	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,546 72
		1,433	$ 80,846 88	61	$13,553 22	12	$ 8,395 75	61	$21,948 97	13	$64,308 80	18	$ 1,350 00	$65,658 80	$168,454 65
	Class No. 8.														
2	Electric light and power plants (lines and appliances, construction and operation)	10	$ 1,118 06	1	$ 428 99	1	$ 921 19	1	$ 1,350 18	....	.....	1	$ 75 00	$ 75 00	$ 2,543 24
4	Electric railways (operation and maintenance)	72	4,186 35	2	1,650 14	1	659 92	2	2,310 06	1	$ 5,760 02	1	75 00	5,835 02	12,331 43
6A	Gasworks (operation and maintenance, including new connections)	13	1,046 73	1	481 78	1	571 44	1	1,053 22	....	.....	....	.....	.....	2,099 95
11	Steam-railways (construction and operation)	2	1,905 77	2	974 25	2	1,563 23	2	2,537 48	....	.....	....	.....	.....	4,443 25
12A	Telegraph systems (operation only)	2	22 83	....	.....	....	.....	....	.....	....	.....	....	.....	.....	22 83
13A	Telephone systems (operation only)	7	164 70	....	.....	....	.....	....	.....	....	.....	....	.....	.....	164 70
13B	Telephone systems (line-work and construction)	13	1,181 64	1	230 51	1	1,089 75	1	1,320 26	....	.....	....	.....	.....	2,501 90
14	Theatre stage (operation)	1	9 08	....	.....	....	.....	....	.....	....	.....	....	.....	.....	9 08
		120	$ 9,635 16	7	$ 3,765 67	6	$ 4,805 53	7	$ 8,571 20	1	$ 5,760 02	2	$ 150 00	$ 5,910 02	$ 24,116 38
	Class No. 9.														
1	Navigation	59	$ 4,753 50	2	$ 344 11	....	.....	2	$ 344 11	1	$ 332 22	1	$ 75 00	$ 407 22	$ 5,504 83
2	Stevedoring	256	23,733 82	6	1,541 68	2	$ 3,399 80	6	4,941 48	....	.....	....	.....	.....	28,675 30
3	Wharves (operation)	30	2,360 75	2	299 70	1	385 60	2	685 30	....	.....	....	.....	.....	3,046 05
4	Salving	2	178 45	....	.....	....	.....	....	.....	....	.....	....	.....	.....	178 45
		347	$ 31,026 52	10	$ 2,185 49	3	$ 3,785 40	10	$ 5,970 89	1	$ 332 22	1	$ 75 00	$ 407 22	$ 37,404 63
	Class No. 10.														
1	Canadian Pacific Railway Co. (construction and operation)	335	$ 23,535 37	20	$ 9,752 87	7	$12,353 58	20	$22,106 45	7	$40,790 22	6	$ 450 00	$41,240 22	$ 86,882 04
2	Canadian Pacific Ocean Services, Ltd	33	3,438 50	1	195 73	1	1,615 50	1	1,811 23	....	.....	....	.....	.....	5,249 73
3A	Consolidated Mining & Smelting Co. of Canada, Ltd. (metal mining)	88	4,550 30	2	545 93	1	921 19	3	1,467 12	2	14,000 29	2	150 00	14,150 29	20,167 71
3B	Consolidated Mining & Smelting Co. of Canada, Ltd. (smelting)	142	9,703 76	5	4,619 46	2	3,410 92	5	8,030 38	1	2,931 36	2	150 00	3,081 36	20,815 50
	Carried forward														

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1920—*Continued.*

Sub-section.	Industry.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
				CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
		No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
	Brought forward	....	$	....	$	....	$	....	$	....	$	....	$	$	$ .....
	Class No. 10—Continued.														
3C	Consolidated Mining & Smelting Co. of Canada, Ltd. (reduction-works, no heat)	19	2,444 76	....	.....	....	.....	....	.....	....	.....	....	.....	.....	2,444 76
4	Dominion Express Co	4	218 54	....	.....	....	.....	....	.....	....	.....	....	.....	.....	218 54
5	Esquimalt & Nanaimo Rly. Co. (construction and operation)	25	677 32	....	.....	....	.....	....	.....	....	.....	....	.....	.....	677 32
6	Kettle Valley Rly. Co. (construction and operation)	27	1,530 75	1	250 00	1	903 91	1	1,153 90	2	4,785 63	1	75 00	4,860 63	7,545 28
7	West Kootenay Power & Light Co	3	147 94	...	.....	....	.....	....	.....	....	.....	....	.....	.....	147 94
8	Coast Copper Co	3	160 83	....	.....	....	.....	....	.....	....	.....	....	.....	.....	160 83
		679	$ 46,408 07	29	$15,363 99	12	$19,205 09	30	$34,569 08	12	$62,507 50	11	$ 825 00	$63,332 50	$144,309 65
	Class No. 11.														
4	Grand Trunk Pacific Rly. Co. (construction and operation)	57	$ 4,058 01	3	$ 952 98	2	$ 2,481 05	3	$ 3,434 03	....	.....	1	$ 75 00	$ 75 00	$ 7,567 04
5B	Grand Trunk Pacific Telegraph Co. (line-work and construction)	1	17 33	....	.....	....	.....	....	.....	....	.....	....	.....	.....	17 33
		58	$ 4,075 34	3	$ 952 98	2	$ 2,481 05	3	$ 3,434 03	....	.....	1	$ 75 00	$ 75 00	$ 7,584 37
	Class No. 12.														
1	Canadian National Railways (construction and operation)	144	$ 7,591 93	4	$ 1,120 54	2	$ 1,396 04	4	$ 2,516 58	2	$15,695 04	3	$ 225 00	$15,920 04	$ 26,028 55
	Class No. 13.														
1	Provincial Government employees	169	$ 13,031 29	7	$ 3,879 33	3	$ 6,013 43	8	$ 9,892 76	3	$18,762 17	3	$ 225 00	$18,987 17	$ 41,911 22
	Class No. 14.														
1	Municipalities (park-men)	5	$ 168 92	....	.....	....	.....	....	.....	....	.....	....	.....	.....	$ 168 92
2	Municipalities (fire departments, paid)	40	2,665 86	1	$ 1,067 82	....	.....	1	$ 1,067 82	....	.....	....	.....	.....	3,733 68
3	Municipalities (police departments)	9	478 79	....	.....	....	.....	....	.....	....	.....	....	.....	.....	478 79
4	Municipalities (street-cleaning and scavenging)	18	1,659 15	1	254 59	1	$ 385 60	1	640 19	....	.....	....	.....	.....	2,299 34
5A	Municipalities (waterworks, operation and maintenance, including new connections)	12	592 17	....	.....	....	.....	....	.....	....	.....	....	.....	.....	592 17
5B	Municipalities (waterworks, construction or extension of plant)	3	47 74	....	.....	....	.....	....	.....	....	.....	....	.....	.....	47 74
6A	Municipalities (reservoirs, dams, or flumes, construction without blast)	1	93 50	....	.....	....	.....	....	.....	....	.....	....	.....	.....	93 50
7A	Municipalities (sewers, operation and maintenance, including new connections)	6	191 75	....	.....	....	.....	....	.....	....	.....	....	.....	.....	191 75
7B	Municipalities (sewers, new construction or extension of plant)	2	86 77	....	.....	....	.....	....	.....	....	.....	....	.....	.....	86 77

8A	Municipalities (road-making, without blasting)	32	1,449 40	2	395 34	....	.....	2	395 34	....	.....	....	.....	.....	1,844 74
8B	Municipalities (road-making, with blasting)	4	101 40	....	.....	....	.....	....	.....	....	.....	....	.....	.....	101 40
9	Municipalities (street-paving)	10	902 49	1	197 74	....	.....	1	197 74	....	.....	....	.....	.....	1,100 23
12	Municipalities (electric light and power plants, lines and appliances, construction and operation)	7	423 12	....	.....	....	.....	....	.....	...	.....	...	.....	.....	423 12
14	Municipalities (navigation)	4	142 68	....	.....	....	.....	....	.....	....	.....	....	.....	.....	142 68
15	Municipalities (School Boards)	9	423 05	....	.....	....	.....	...	.....	....	.....	..	.....	.....	423 05
16	Municipalities (construction, N.E.S.)	3	115 15	....	.....	....	.....	....	.....	....	.....	....	.....	.....	115 15
	Class No. 15.	165	$ 9,541 94	5	$ 1,915 49	1	$ 385 60	5	$ 2,301 09	....	.....	....	.....	.....	$ 11,843 03
1	Canning and packing of fish	79	$ 5,936 21	5	$ 993 19	3	$ 4,836 57	5	$ 5,829 76	1	$ 4,059 85	....	.....	$ 4,059 85	$ 15,825 82
2	Fish oil and fertilizer manufacturing	4	304 33	....	.....	....	.....	....	.....	....	.....	....	.....	.....	304 33
4	Fishing or whaling	46	3,123 70	2	308 57	2	1,134 77	2	1,443 34	5	16,803 60	...	.....	16,803 60	21,370 64
	Class No. 16.	129	$ 9,364 24	7	$ 1,301 76	5	$ 5,971 34	7	$ 7,273 10	6	$ 20,863,45	....	.....	$ 20,863 45	$ 37,500 79
1	Explosive-manufacturing	29	$ 1,643 32	3	$ 2,583 39	2	$ 2,473 93	3	$ 5,057 32	1	$ 2,880 17	1	$ 75 00	$ 2,955 77	$ 9,656 41
4	Chemical-manufacturing (N.E.S.)	2	223 12	....	.....	....	.....	....	.....	...	.....	....	.....	.....	223 12
	Class No. 17.	31	$ 1,866 44	3	$ 2,583 39	2	$ 2,473 93	3	$ 5,057 32	1	$ 2,880 77	1	$ 75 00	$ 2,955 77	$ 9,879 53
1	Retailers' employees, on request (where more than 5 affected, this rate includes deliveries)	21	$ 780 44	2	$ 357 12	2	$ 1,985 62	2	$ 2,342 74	....	.....	....	.....	.....	$ 3,123 18
2	Deliveries	109	6,324 56	5	1,582 22	2	1,304 00	5	2,886 22	1	$ 1,256 63	....	.....	$ 1,256 63	10,467 41
3	Operation of coal and wood yards	38	2,150 38	3	406 61	1	903 90	3	1,310 51	....	.....	...	.....	.....	3,460 89
5	Wholesalers	55	1,664 74	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,664 74
6	Auto transportation	8	189 35	...	.....	....	.....	....	.....	....	.....	...	.....	.....	189 35
7	Warehousing	17	820 81	....	.....	....	.....	....	.....	....	.....	1	$ 75 00	75 00	895 81
8	Teaming and cartage	36	1,032 21	....	.....	....	.....	....	.....	....	.....	....	.....	.....	1,032 21
	Class No. 18.	284	$ 12,962 49	10	$ 2,345 95	5	$ 4,193 52	10	$ 6,539 47	1	$ 1,256 63	1	$ 75 00	$ 1,331 63	$ 20,833 59
1	Great Northern Rly. Co	45	$ 4,055 94	2	$ 265 28	....	.....	2	$ 265 28	1	$ 6,773 11	1	$ 75 00	$ 6,848 11	$ 11,169 33
	Class No. 19.														
1	Dominion Government	22	$ 907 50	3	$ 713 47	....	.....	3	$ 713 47	3	$ 14,205 03	....	.....	$ 14,205 03	$ 15,826 00

TABLE A 1.—SUMMARY BY CLASSES OF TABLE A.

Class.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.					FATAL ACCIDENTS.					ALL FINAL AWARDS.
			CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.	PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	Total Amount
	No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		
Class No. 1	4,711	$ 311,073 91	233	$ 67,177 36	76	$ 83,527 12	235	$ 150,704 48	29	$ 150,136 94	90	$ 5,936 87	$ 156,073 81	$ 617,852 20
Class No. 2	330	14,401 30	35	7,568 76	9	9,918 34	37	17,487 10	1	7,681 79	....	.....	7,681 79	39,570 19
Class No. 3	1,039	82,426 55	35	14,809 48	15	25,267 65	36	40,077 13	12	75,835 01	17	1,275 00	77,110 01	199,613 69
Class No. 4	622	44,018 90	33	8,029 94	14	25,214 76	34	33,244 70	3	6,708 70	9	675 00	7,383 70	84,647 30
Class No. 5	364	14,998 63	21	3,316 28	5	3,367 07	21	6,683 35	3	19,585 50	3	225 00	19,810 50	41,492 48
Class No. 6	474	18,248 84	21	6,400 16	4	3,361 00	21	9,761 16	....	.....	1	75 00	75 00	28,085 00
Class No. 7	1,433	80,846 88	61	13,553 22	12	8,395 75	61	21,948 97	13	64,308 80	18	1,350 00	65,658 80	168,454 65
Class No. 8	120	9,635 16	7	3,765 67	6	4,805 53	7	8,571 20	1	5,760 02	2	150 00	5,910 02	24,116 38
Class No. 9	347	31,026 52	10	2,185 49	3	3,785 40	10	5,970 89	1	332 22	1	75 00	407 22	37,404 63
Class No. 10	679	46,408 07	29	15,363 99	12	19,205 09	30	34,569 08	12	62,507 50	11	825 00	63,332 50	144,309 65
Class No. 11	58	4,075 34	3	952 98	2	2,481 05	3	3,434 03	....	.....	1	75 00	75 00	7,584 37
Class No. 12	144	7,591 93	4	1,120 54	2	1,396 04	4	2,516 58	2	15,695 04	3	225 00	15,920 04	26,028 55
Class No. 13	169	13,031 29	7	3,879 33	3	6,013 43	8	9,892 76	3	18,762 17	3	225 00	18,987 17	41,911 22
Class No. 14	165	9,541 94	5	1,915 49	1	385 60	5	2,301 09	....	.....	....	.....	.....	11,843 03
Class No. 15	129	9,364 24	7	1,301 76	5	5,971 34	7	7,273 10	6	20,863 45	....	.....	20,863 45	37,500 79
Class No. 16	31	1,866 44	3	2,583 39	2	2,473 93	3	5,057 32	1	2,880 77	1	75 00	2,955 77	9,879 53
Class No. 17	284	12,962 49	10	2,345 95	5	4,193 52	10	6,539 47	1	1,256 63	1	75 00	1,331 63	20,833 59
Class No. 18	45	4,055 94	2	265 28	....	.....	2	265 28	1	6,773 11	1	75 00	6,848 11	11,169 33
Class No. 19	22	907 50	3	713 47	....	.....	3	713 47	3	14,205 03	....	.....	14,205 03	15,826 00
	11,166	$ 716,481 87	529	$ 157,248 54	176	$ 209,762 62	537	$ 367,011 16	92	$ 473,292 68	162	$ 11,336 87	$ 484,629 55	$1,568,122 58

TABLE B.—ANALYSIS OF 11,166 TEMPORARY TOTAL DISABILITY ACCIDENTS.

Sub-class.	Industry.	No. of accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Average Age.	Receiving other Benefits.	Nationality.													
					Male.	Female.	Married.	Single.	Unknown.			British.	Canadian.	American.	French.	Italian.	Russian.	German.	Austrian.	Chinese.	Japanese.	Norwegian.	Swedish.	Native of India.	Others.
	Class No. 1.																								
1	Creosoting-works	12	$ 2,567 29	$5 29	12	....	8	4	....	41	....	8	3	....	....	....	....	....	....	....	....	1	....	....	....
2	Lath-mills, including yards and delivery	22	2,006 09	4 62	22	....	7	12	3	20	....	7	4	....	....	....	....	....	....	5	4	....	....	2	....
3	Lumbering, including logging, river-driving, rafting, or booming	2,400	384,961 90	6 03	2392	8	771	1557	72	35	36	964	579	193	21	34	142	6	17	52	124	50	127	21	70
4	Pulp and paper-manufacturing	282	28,870 71	5 25	282	....	124	139	19	33	25	103	42	13	2	25	8	....	....	20	62	....	2	1	4
5	Sawmills, including yards and delivery	1,462	180,342 96	4 97	1462	....	743	631	88	37	36	661	247	61	3	15	22	2	3	162	179	9	16	62	20
6	Shingle-mills, including yards and delivery	396	59,345 72	6 30	396	....	235	132	29	34	6	112	64	22	2	3	....	1	....	163	19	1	3	3	3
7	Logging-railways (operation, maintenance, and construction)	137	23,025 41	6 07	137	....	42	86	9	36	2	67	27	9	1	4	4	....	2	3	9	2	4	5	....
	Class No. 2.	4,711	$681,120 08	.....	4703	8	1930	2561	220	...	105	1922	966	298	29	81	176	9	22	405	397	63	152	94	97
4	Broom and mop manufacturing	4	$ 77 10	$2 35	4	....	1	3	....	23	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....
5	Carpentering (shop only)	2	179 26	4 34	2	....	....	2	....	31	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
6	Coffins, wooden, manufacturing	4	126 87	3 44	4	....	1	3	....	24	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
7	Cooperage (no stave or head manufacturing)	11	983 26	4 07	11	....	5	6	....	34	....	8	1	....	....	....	....	....	....	2	....	....	....	....	....
8	Veneer and excelsior manufacturing	8	329 67	3 50	8	....	2	5	1	28	....	4	2	1	....	....	....	....	....	1	....	....	....	....	....
9	Furniture-manufacturing	20	1,339 06	3 82	20	....	10	8	2	35	1	14	6	....	....	....	....	....	....	....	....	....	....	....	....
11	Pail and tub manufacturing	1	29 23	4 50	1	....	1	....	....	33	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
12	Picture-framing	1	62 67	5 45	1	....	1	....	....	52	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
13	Wood-working plants, planing-mills	139	14,417 68	4 39	137	2	78	55	6	31	1	69	27	2	1	2	1	....	1	19	12	1	1	....	3
14	Sash and door manufacturing	30	3,057 08	4 29	30	..	18	12	....	34	....	23	4	1	....	....	....	....	....	....	2	....	....	....	....
16	Vehicle-manufacturing	5	753 40	5 10	5	....	3	2	....	39	....	2	2	1	....	....	....	....	....	....	....	....	....	....	....
17	Wooden-box manufacturing	90	7,304 58	4 19	90	....	34	47	9	32	....	49	18	1	....	....	....	....	....	....	10	4	....	7	1
19	Lumber-yards (operation not connected with mills)	2	510 00	5 25	2	....	1	1	....	31	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....
20	Spokes, staves, and heads manufacturing	7	721 73	4 98	7	....	5	2	....	34	....	2	3	....	....	....	....	....	....	2	....	....	....	....	....
21	Wooden-toy manufacturing	6	492 29	4 86	6	....	3	2	1	39	....	6	....	....	....	....	....	....	....	....	....	....	....	....	....
	Class No. 3.	330	$ 30,383 90	.....	328	2	163	148	19	....	3	189	65	6	1	2	1	....	1	24	24	5	1	7	4
1	Coal-mining	1,039	$176,382 86	$5 77	1039	...	647	377	15	36	164	571	108	12	3	94	62	....	44	65	30	4	1	....	45
	Class No. 4.																								
2	Cement-manufacturing (factory only)	2	$ 512 50	$5 00	2	....	1	1	....	40	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....
4	Sand, shale, clay, and gravel pits	6	318 66	4 80	6	..	2	4	....	41	1	4	2	....	....	....	....	....	....	....	....	....	....	....	....
10A	Lime-kilns (with quarry)	3	1,057 98	4 67	3	....	2	1	....	30	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....
11	Metal-mining	520	81,047 67	5 42	520	....	162	339	19	37	10	236	88	36	1	48	28	5	3	11	5	17	...	....	42
12	Monuments, lettering or setting	2	160 00	5 80	2	....	1	1	....	41	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
13	Quarrying	14	2,042 36	5 73	14	....	9	5	....	41	....	9	1	1	....	....	1	1	1	....	....	....	....	....	....
15	Stone dressing or cutting	6	772 10	7 10	6	....	5	1	....	41	....	6	....	....	....	....	....	....	....	....	....	....	....	....	....
16	Reduction of ores and smelting	62	5,888 41	5 36	62	....	15	44	3	33	1	31	6	1	....	10	3	2	....	1	2	2	....	....	4
17	Brick-manufacturing including clay-digging operations	6	233 91	4 84	6	....	5	1	....	28	....	4	....	....	....	....	....	....	2	....	....	....	....	....	....
17A	Brick-manufacturing, (no clay-digging operations)	1	84 00	8 00	1	..	....	1	....	54	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
		622	$ 92,117 59	.....	622	....	202	398	22	....	12	294	99	39	1	59	32	8	6	12	7	19	....	....	46

TABLE B.—ANALYSIS OF 11,166 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Sub-class.	Industry.	No. of Accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Average Age.	Received other Benefits.	Nationality.													
					Male.	Female.	Married.	Single.	Unknown.			British.	Canadian.	American.	French.	Italian.	Russian.	German.	Chinese.	Japanese.	Norwegian.	Swedish.	Austrian.	Natives of India.	Others.
	Class No. 5.																								
1	Auto-repairing	91	$ 7,843 04	$ 4 88	91	...	49	39	3	28	5	1	22	6	....	...	...	....	....	1	1	...	....	....	....
3	Blacksmith-shops	18	1,600 28	4 87	18	....	11	6	1	37	1	13	5	....	....	....	....	....	....	....	....	....	....	....	....
3A	Horse-shoeing	1	40 00	5 00	1	....	1	....	....	57	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
4	Nuts, bolts, nails, spikes, manufacturing (cold process)	5	949 13	4 77	5	....	3	2	..	36	....	3	....	....	....	1	....	....	....	....	....	....	....	....	1
5	Nuts, bolts, nails, spikes, manufacturing (hot process)	1	57 20	2 60	1	....	....	1	....	16	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....
6	Can-manufacturing (no hand-feed stamping)	8	369 49	3 87	5	3	2	6	...	30	....	6	1	....	....	1	....	....	....	....	....	....	....	....	....
7	Can-manufacturing (with hand-feed stamping)	20	1,245 99	2 61	11	9	4	16	...	19	1	9	9	2	....	....	....	....	....	....	....	....	....	....	....
8A	Boiler-manufacturing	34	3,029 91	5 78	14	....	19	12	3	34	6	27	6	....	....	....	....	....	....	....	....	....	....	....	1
8B	Engine-manufacturing	4	285 38	4 75	4	....	1	3	....	31	1	3	...	1	....	....	....	....	....	....	....	....	....	....	....	....
9	Iron and steel foundry	44	4,159 79	4 85	44	....	28	14	2	35	3	32	8	1	....	1	....	....	....	....	1	1	....	....	....
10	Stove and furnace manufacture and installation	3	158 75	3 25	3	....	1	2	...	25	..	2	1	....	....	....	....	....	....	....	....	....	....	....	....
11	Machine-shops	75	6,254 69	5 12	74	1	37	34	4	34	3	55	12	2	....	1	1	....	....	1	....	....	....	....	3
12	Iron, steel, and metal products manufacturing	24	2,753 11	4 98	24	...	13	11	....	34	....	12	7	1	....	1	....	....	....	2	....	....	....	....	1
12A	Iron and steel manufacture (N.E.S.)	3	244 58	4 35	3	....	2	1	....	44	...	2	....	....	....	....	....	....	....	1	....	....	....	....	....
13	Metalware (small) manufacturing	2	38 30	2 60	2	....	....	2	....	18	1	1	1	....	....	....	....	....	....	....	....	....	....	....	....
14	Ornamental-iron works (shop-only)	1	155 82	6 36	1	....	....	1	....	33	...	1	....	....	....	....	....	....	....	....	....	....	....	....	....
15	Rolling-mills	8	377 12	4 08	8	....	3	5	....	37	2	4	2	....	....	....	....	....	2	....	....	....	....	....	....
16	Sheet-metal works (construction, erection, and repair)	19	2,488 86	4 79	18	1	7	12	....	26	1	11	7	1	....	....	....	....	....	....	....	....	....	....	....
17	Fabrication of structural steel, iron, or metal	2	846 40	4 20	2	....	....	2	....	35	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
19	Acetylene-gas manufacturing	1	45 00	6 00	1	..	1	....	....	36	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
		364	$ 32,942 84	....	350	14	182	169	13	....	26	246	82	14	....	5	1	....	2	5	2	1	....	....	6
	Class No. 6.																								
1	Tent and awning manufacturing	2	$ 242 74	$ 4 52	1	1	1	1	...	30	....	....	1	1	...	....	....	....	....	....	....	....	....	....	....
2A	Bakeries (with delivery)	15	2,459 13	4 75	15	....	10	5	....	33	2	13	2	....	....	....	....	....	....	....	....	....	....	....	....
2B	Bakeries (no delivery)	1	119 92	5 33	1	....	....	1	...	26	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
3	Confectionery-manufacturing	14	407 90	2 76	9	5	3	11	...	23	....	12	1	....	....	....	....	....	....	....	1	....	....	....	....
3A	Biscuit-manufacturing	6	481 26	3 50	5	1	2	4	....	24	....	4	2	....	....	....	....	....	....	....	....	....	....	....	....
4	Liquors and beverages manufacturing, including bottling and delivery	44	5,037 02	4 47	43	1	23	19	2	31	1	33	10	....	....	1	....	....	....	....	....	....	....	....	....
5	Butcher-shops (without delivery)	48	3,027 94	4 09	48	....	21	26	1	29	7	30	14	1	....	1	1	...	1	....	....	....	....	....	....
6	Steam-heating plants (N.E.S.)	3	255 54	3 95	3	....	3	....	....	54	....	1	....	1	....	....	....	....	....	1	....	....	....	....	....
7	Canning and packing fruits or vegetables	42	2,288 03	4 44	31	11	21	19	2	33	3	28	9	3	....	....	....	....	1	....	....	....	....	....	1
8	Nitrogen products	4	203 75	4 25	4	....	1	3	....	35	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
9	Compounds (N.E.S.) manufacturing	4	285 21	3 88	4	....	1	3	....	29	....	3	....	....	....	....	1	....	....	....	....	....	....	....	....	....
11	Cleaning and dyeing	1	56 42	3 64	1	....	....	1	....	19	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
12	Cloth, textiles, or clothing manufacturing	7	1,313 91	5 06	5	2	5	2	....	38	....	6	1	....	....	....	....	....	....	....	....	....	....	....	....	....
13	Hotel and hospital employees	4	327 50	4 27	4	....	3	1	....	53	...	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....
14	Cold-storage plants (no teaming)	1	132 71	5 77	1	....	1	....	....	27	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
15	Cold-storage plants (with teaming)	4	269 70	3 88	4	....	3	1	....	33	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....
16	Creameries, including delivery	38	4,531 29	4 46	37	1	22	15	1	31	1	27	8	....	....	....	....	....	1	2	....	....	....	....	....	....
18	Elevators (operation)	3	280 22	3 68	3	....	2	1	....	37	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
20	Surveying	1	54 00	4 00	1	....	....	1	....	45	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
21	Flour-milling	14	1,096 72	4 20	14	....	13	1	....	32	....	10	2	1	....	....	....	....	1	....	....	....	....	....	....	....
22	Food-products manufacturing (N.E.S.)	36	2,618 97	4 09	32	4	25	11	....	33	1	27	5	2	....	....	....	....	1	1	....	....	....	....	....	....

23	Handling of grain	11	413	14	4	08	10	1	8	3	....	37	3	9	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
24	Silver-plating, bevelling, and leaded glass	1	140	00	5	00	1	....	....	1	....	25	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
25	Glass-manufacturing and repairing	2	71	40	5	75	2	....	2	....	....	36	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
26	Ice-manufacturing (with delivery)	3	102	36	4	64	3	....	1	2	....	29	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
27	Janitors (on request)	7	715	63	4	08	7	....	5	1	1	38	1	7	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
29	Knitting-mills	2	90	92	4	77	2	....	1	1	....	26	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
31	Laundries (power)	29	1,852	78	3	71	16	13	22	7	....	32	....	23	5	1	....	....	....	....	....	....	....	....	....	....	....	....	....
33	Leather-shoes manufacturing or repairing	8	388	83	4	45	6	2	4	4	....	30	....	6	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
34	Leather-goods manufacturing	2	300	11	3	62	2	....	1	1	....	27	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
36	Oil refining and distribution	13	1,371	23	5	89	13	....	11	2	....	42	....	11	1	....	....	....	....	....	....	....	....	....	....	....	....	....	1
37	Packing-houses (slaughtering, with or without teaming)	48	2,639	01	4	63	47	1	26	20	2	33	3	31	7	2	1	....	3	....	1	....	....	....	....	....	....	....	3
38	Packing-houses (no slaughtering, with teaming)	10	669	93	4	42	10	....	7	3	....	32	1	6	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....
39	Paint-manufacturing	7	1,960	74	5	35	7	....	3	4	....	37	....	6	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
40	Tar, tarred, pitch, or asphalted paper manufacturing	5	787	35	4	28	5	....	1	4	....	27	1	4	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
41	Printing, lithographing, and engraving	21	1,706	57	4	20	16	5	7	13	1	30	1	15	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....
42	Rubber or rubber-goods manufacturing	6	553	33	4	02	6	....	3	3	....	38	....	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
43	Stationery-manufacturing	5	151	43	2	42	3	2	1	4	....	19	1	3	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
44	Upholstering	2	76	63	3	32	1	1	1	1	....	24	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
		474	$ 39,491	27	.....		423	51	264	200	10	....	26	345	89	14	2	2	5	..	6	4	1	....	....	....	6	
	Class No. 7.																												
2	Bridge-building (steel)	2	$ 276	00	$ 7	00	2	..	2	..	....	43	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
3	Bridge-building (wooden)	15	2,834	45	6	48	15	....	6	9	....	43	....	8	4	1	....	....	....	....	....	....	....	....	1	....	....	1	....
4	Building construction (N.E.S.)	195	28,398	99	5	79	195	....	118	67	10	40	5	136	33	4	1	6	3	1	....	....	2	6	....	....	3	....
5	Structural carpentry	38	3,759	27	5	53	38	....	29	9	....	42	2	26	10	....	....	....	2	....	....	....	....	....	....	....	....	....	....
6	Reservoirs, dams, or flumes (construction with blast)	1	190	00	5	00	1	....	....	1	....	26	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
7	Reservoirs, dams, or flumes (construction without blast)	1	104	50	5	50	1	....	....	1	....	32	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....
8	Dredging	31	4,235	00	4	97	31	....	20	10	1	37	1	21	6	....	....	....	....	....	....	....	....	4	....	....	....	....	....
9	Dry-docks, construction of	3	95	80	5	28	3	....	2	1	....	37	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
10	Electric wiring of buildings	15	1,416	07	5	97	15	....	9	6	....	31	2	11	1	1	....	..	....	....	....	....	1	1	....	....	....	....	....
11	Steam-railways (construction and operation)	255	32,731	60	5	65	255	....	69	181	5	38	3	107	40	15	2	11	23	....	....	....	8	23	7	....	19	....
12	Floor-laying (mosaic, tiles, or terrazzo)	3	488	12	7	15	3	....	1	2	....	27	....	2	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....
14	Plumbing and heating	30	2,606	37	5	73	30	....	20	10	....	35	1	21	8	1	....	....	....	....	....	....	....	....	....	....	....	....	....
15	House-moving	4	202	00	4	95	4	....	3	1	....	43	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
15A	House-wrecking	7	1,094	50	5	57	7	....	3	4	....	41	....	5	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
16	Installation of boilers, engines, machinery, marine elevators, iron stairs, etc.	8	2,175	72	7	12	8	....	2	6	....	36	....	5	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
16A	Removing of boilers, etc	1	267	00	6	00	1	....	..	1	....	23	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
17	Installation of elevators	1	70	20	7	02	1	....	1	....	....	55	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
18	Irrigation works, construction of	17	2,021	70	5	29	17	....	4	12	1	40	....	12	3	....	....	....	....	....	....	....	....	1	....	....	1	....	....
20A	Marine-railway (operation, including repairs of vessels not exceeding 50 tons weight)	2	335	88	5	67	2	...	1	1	....	31	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
20B	Marine-railway (operation, including repairs of vessels exceeding 50 tons weight)	26	4,632	38	5	96	26	...	21	5	....	40	3	17	6	....	....	1	....	....	....	....	....	1	1	....	....	....
21	Mason-work	2	592	50	7	75	2	....	1	1	....	40	....	1	1	...	....	....	....	....	....	....	....	....	....	....	....	....	....
22	Painting	8	1,448	04	5	48	8	....	8	....	....	47	....	8	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
23	Painting high steel or other high structures	4	718	46	4	55	4	....	....	3	1	35	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
25	Pier construction	6	557	20	6	13	6	....	3	3	....	42	....	5	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
26	Pile-driving	26	4,495	04	6	95	26	....	15	10	1	38	...	13	9	1	....	....	....	....	....	....	1	2	....	....	....	....	....
27	Plastering	6	348	05	5	44	6	...	2	4	...	29	....	4	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....
28	Reinforced-concrete erection	1	33	00	4	40	1	....	....	1	....	46	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....
29	Road-making (with blasting)	9	556	42	4	79	9	....	4	4	1	35	...	6	1	...	....	2	....	....	....	....	....	....	....	....	....	....	....
30	Road-making (without blasting)	15	1,492	04	5	79	15	....	11	4	....	34	....	12	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
31	Roofing	5	494	40	6	25	5	....	1	4	....	41	....	2	2	....	....	....	....	....	....	....	1	....	....	....	....	....	....
32	Street-cleaning or scavenging	.....	21	00	.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
34	Sewers (operation and maintenance, including new connections)	1	38	40	4	80	1	....	1	....	....	40	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
35	Sewers (new construction or extension of plant)	3	112	35	5	43	3	....	1	1	1	35	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
36	Sheet-metal erection	4	993	05	6	63	4	....	2	2	...	34	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
38	Steel-ship building	575	54,913	02	5	13	575	....	349	220	6	35	97	453	91	9	1	7	4	....	....	....	5	1	1	....	3	....
	Carried forward	.....	$		.....		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE B.—ANALYSIS OF 11,166 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Sub-class.	Industry.	No. of accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Average Age.	Receiving other Benefits.	Nationality.													
					Male.	Female.	Married.	Single.	Unknown.			British.	Canadian.	American.	French.	Italian.	Russian.	German.	Chinese.	Japanese.	Norwegian.	Swedish.	Austrian.	Native of India.	Others.
	Brought forward																								
	Class No. 7—Continued.																								
41	Tunnelling or well-digging	1	83 25	4 50	1			1		29						1									
41A	Excavations (N.E.S.)	3	290 50	4 50	3		1	2		31		2	1												
42	Waterworks construction or extension of plant	2	174 72	4 71	2		1	1		32		2													
44	Waterworks (operation and maintenance, including new connections)	2	46 85	4 42	2		2			45		1	1												
45	Well-drilling	3	444 50	6 67	3		2	1		42		1	1	1											
48	Wooden-ship construction	80	18,276 05	5 40	80		55	22	3	38	19	68	8			1				2					1
49	Boat-manufacturing (less than 50 tons weight)	22	3,173 90	5 69	22		16	6		36	3	10	6				2			3		1			
		1,433	$177,232 39		1,433		786	617	30		134	978	246	35	5	30	35	1		5	24	37	9		28
	Class No. 8.																								
2	Electric light and power plants (lines and appliances, construction and operation)	10	$ 2,335 62	$ 6 04	10		4	6		37		8	2												
4	Electric railways (operation and maintenance)	72	8,992 00	5 04	72		46	24	2	41	8	47	18	1		6									
6A	Gasworks (operation and maintenance, including new connections)	13	2,214 73	5 19	13		11	2		40		8	3		1	1									
11	Steam-railways (construction and operation)	2	3,493 39	4 86	2		1	1		31		1	1												
12A	Telegraph systems (operation only)	2	53 80	2 05	2			2	1	14		2													
13A	Telephone systems (operation only)	7	386 78	3 87	3	4	2	5		40		5	2												
13B	Telephone systems (line-work and construction)	13	2,461 90	5 23	13		8	5		38	1	7	6												
14	Theatre stage (operation)	1	25 50	3 00	1		1			24		1													
		120	$ 19,963 72		116	4	73	45	2		9	79	32	1	1	7									
	Class No. 9.																								
1	Navigation	59	$ 10,183 66	$ 4 92	59		24	33	2	33		40	15	1						1		2			
2	Stevedoring	250	46,851 08	4 98	256		162	89	5	41	7	236	10	3		2	1				2	2			
3	Wharves (operation)	30	5,142 57	4 89	30		24	6		40		23	2		1	2	1			1					
4	Salving	2	377 54	4 58	2		1	1		48		2													
		347	$ 62,554 85		347		211	129	7		7	301	27	4	1	4	2			2	2	4			
	Class No. 10.																								
1	Canadian Pacific Rly. Co. (construction and operation)	335	$ 49,103 80	$ 4 95	335		174	155	6	37	20	182	76	8	1	13	3	2	22	5	3	10	1	2	7
2	Canadian Pacific Ocean Services, Ltd	33	6,639 02	3 88	33		11	22		29		25	7	1											
3A	Cons. Mining & Smelting Co. of Canada (metal mining)	88	9,624 22	4 78	88		34	53	1	34	8	35	20	6	1	13	3				2	2	3		3
3B	Cons. Mining & Smelting Co. of Canada (smelting)	142	20,025 11	4 93	142		72	64	6	37	11	63	20	5	26	12							9		7
3C	Cons. Mining & Smelting Co. of Canada (reduction-works, no heat)	19	4,737 85	4 76	19		8	10	1	32	5	12	3			2	1				1				
4	Dominion Express Co	4	482 58	7 09	4		3	1		32	2	3	1												
	Carried forward																								

5	Esquimalt & Nanaimo Rly. Co. (construction and operation)	25	1,598 10	3 69	25	....	14	11	....	....	1	14	3	....	....	....	....	....	8	....	....	....	....	....	....	....
6	Kettle Valley Rly. Co. (construction and operation)	27	3,431 61	4 60	27	....	15	11	1	37	3	14	4	3	....	....	....	....	3	2	....	....	....	....	....	1
7	West Kootenay Power & Light Co.	3	432 96	7 26	3	....	1	2	....	39	....	2	....	1	....	....	....	....	....	....	....	....	....	....	....	....
8	Coast Copper Co.	3	528 83	6 36	3	....	1	2	....	37	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....
		679	$ 96,604 08	.....	679	....	333	331	15	....	50	352	135	24	28	40	7	2	33	7	6	12	13	2	18
	Class No. 11.																								
4	Grand Trunk Pacific Rly. Co. (construction and operation)	57	$ 10,920 00	$ 5 68	57	....	26	29	2	35	8	26	13	5	....	....	2	....	5	4	....	....	2	....	....
5B	Grand Trunk Telegraph Co. (line-work and construction)	1	47 25	5 25	1	....	1	....	....	26	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
		58	$ 10,967 25	.....	58	....	27	29	2	....	8	26	13	6	....	....	2	....	5	4	....	....	2	....	....
	Class No. 12.																								
1	Canadian National Rlys. (construction and operation)	144	$ 17,852 01	$ 6 27	144	....	74	68	2	39	26	89	34	7	1	3	1	....	6	...	1	....	....	1	1
	Class No. 13.																								
1	Provincial Government employees	169	$ 26,712 25	$ 4 92	169	....	84	79	6	40	2	140	21	5	....	....	....	....	....	1	2	...	...	....	....
	Class No. 14.																								
	Municipalities—																								
1	Park-men	5	$ 371 33	$ 4 29	5	....	4	1	....	50	....	5	....	....	...	...	....	....	....	...	....	....	....	....	....
2	Fire departments (paid)	40	5,376 15	4 45	40	....	28	12	...	33	7	35	5	....	....	....	....	....	....	....	....	....	....	....	....
3	Police departments	9	993 87	4 42	9	....	9	....	....	40	1	8	1	....	....	....	....	....	....	....	....	....	....	....	....
4	Street-cleaning and scavenging	18	3,261 45	4 53	18	....	18	....	....	49	1	15	3	....	....	....	....	....	....	....	....	....	....	....	....
5A	Waterworks (operation and maintenance, including new connections)	12	1,241 91	4 59	12	...	9	3	...	42	1	10	2	...	....	....	....	....	....	....	....	....	....	....	....
5B	Waterworks construction or extension of plant	3	131 95	5 02	3	....	2	1	...	39	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
6A	Reservoirs, dams, or flumes, construction without blast	1	185 00	5 00	1	....	....	1	....	39	....	...	....	1	....	....	..	....	....	....	....	....	....	....	....
7A	Sewers (operation and maintenance, including new connections)	6	428 65	4 44	6	....	5	1	....	44	....	4	2	....	....	....	....	....	....	....	....	....	....	....	....
7B	Sewers (new construction or extension of plant)	2	183 25	4 25	2	....	2	....	....	36	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
8A	Road-making (without blasting)	32	3,042 30	4 76	32	..	19	12	1	47	2	26	4	1	....	1	....	....	....	....	....	....	....	....	....
8B	Road-making (with blasting)	4	237 58	4 43	4	...	3	1	....	36	...	3	1	..	....	....	....	....	....	....	....	....	....	....	....
9	Street-paving	10	1,801 31	5 08	10	....	9	...	1	50	....	8	1	....	....	....	....	....	....	....	....	....	....	1	....
12	Electric light and power-plants, lines and appliances (construction and operation)	7	863 81	4 50	7	....	2	5	....	32	1	5	2	....	....	....	....	....	....	....	....	....	....	....	....
14	Navigation	4	312 84	4 45	4	....	2	2	....	49	1	3	1	....	....	....	....	....	....	....	....	....	....	....	....
15	School Boards	9	912 36	4 89	7	2	7	2	....	40	....	9	....	....	....	....	....	....	....	....	....	....	....	....	....
16	Construction (N.E.S.)	3	259 00	5 51	3	....	2	1	....	40	....	1	2	...	....	....	....	....	....	....	....	....	....	....	....
		165	$ 19,600 96	.....	163	2	121	42	2	....	14	137	24	2	....	1	....	....	....	....	....	....	....	1	....
	Class No. 15.																								
1	Canning and packing of fish	79	$ 12,664 30	$ 5 25	73	6	46	28	5	39	1	49	8	5	....	....	...	....	9	6	....	1	....	....	1
2	Fish oil and fertilizer manufacturing	4	602 22	4 53	4	....	....	3	1	33	....	2	...	....	....	....	1	....	1	....	..	....	....	....	....
4	Fishing or whaling	46	7,300 05	5 46	46	....	24	16	6	42	1	26	4	4	..	....	1	....	2	7	2	....	....	....	....
		129	$ 20,566 57	.....	123	6	70	47	12	....	2	77	12	9	....	....	2	....	12	13	2	1	....	....	1
	Class No. 16.																								
1	Explosive manufacturing	29	$ 3,390 03	$ 4 62	29	....	17	10	2	39	1	19	3	....	...	....	....	...	6	....	1	....	....	....	....
4	Chemical manufacturing (N.E.S.)	2	436 98	5 22	2	...	1	1	....	37	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
		31	$ 3,827 01	.....	31	...	18	11	2	....	1	21	3	....	....	....	....	....	6	....	1	....	....	....	....

TABLE B.—ANALYSIS OF 11,166 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Sub-class.	Industry.	No. of accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Average Age.	Receiving other Benefits.	Nationality.														
					Male.	Female.	Married.	Single.	Unknown.			British.	Canadian.	American.	French.	Italian.	Russian.	German.	Chinese.	Japanese.	Norwegian.	Swedish.	Austrian.	Native of India.	Others.
	Class No. 17.																									
1	Retailers' employees, on request	21	$ 1,675 41	$4 10	21	....	13	8	...	31	3	12	8	...	....	....	....	....	1	....	....	....	....	....	....	....
2	Deliveries	109	12,650 04	4 17	108	1	54	52	3	31	7	77	25	4	...	1	....	....	1	....	....	....	....	....	....	1
3	Operation of coal and wood yards	38	4,460 74	4 78	38	....	23	14	1	38	....	24	7	1	..	1	....	....	4	....	....	....	....	....	....	1
5	Wholesalers	55	3,791 49	4 23	53	2	31	22	2	36	1	41	13	1	....	....	....	....	....	....	....	....	....	....	....	....
6	Auto transportation	8	451 78	4 47	8	....	4	4	....	28	....	6	1	....	....	....	....	1	....	....	....	....	....	....	....	....
7	Warehousing	17	1,743 00	4 61	17	....	10	7	....	38	....	12	5	....	....	....	....	....	....	....	....	....	....	....	....	....
8	Teaming and cartage	36	2,379 56	4 60	36	....	20	16	....	32	1	32	3	1	....	....	....	....	....	....	....	....	....	....	....	....
		284	$ 27,152 02	.....	281	3	155	123	6	....	12	204	62	7	....	2	....	1	6	....	...	....	....	....	....	2
	Class No. 18.																									
1	Great Northern Rly. Co	45	$ 8,472 10	$5 21	45	....	19	25	1	34	5	18	13	10	....	....	1	....	2	1	....	...	....	...	....	....
	Class No. 19.																									
	Dominion Government	22	$ 2,012 91	$4 88	22	....	10	10	2	42	1	20	2	....	....	....	....	....	....	....	....	....	....	....	....	....

TABLE B 1.—SUMMARY OF TABLE B.

Total wage loss		$1,545,956.66
Conjugal state—		
Married	5,369	
Single	5,409	
Unknown	388	
		11,166
Sex—		
Male	11,076	
Female	90	
		11,166
Receiving other benefits		593
Nationalities—		
British	6,009	
Canadian	2,033	
American	493	
French	72	
Italian	330	
Russian	327	
German	21	
Chinese	584	
Japanese	500	
Scandinavian	341	
Austrian	97	
Natives of India	105	
Others	254	
		11,166

TABLE C.—STATEMENT SHOWING THE CAUSES OF ALL FINALLED ACCIDENTS DURING 1920.

Cause of Accidents.	T.T.D.		P.P.D.		FATALS.		Total.
	No. of Accidents.	Payments.	No. of Accidents.	Payments.	No. of Accidents.	Payments.	
Prime Movers.							
Steam-engines	16	$ 1,674 76	2	$ 237 01	....	$ 150 00	$ 2,061 77
Electric motors and dynamos	7	272 22	....	.....	....	.....	272 22
Gas or gasolene engines, including all internal-combustion engines	11	797 44	1	62 84	....	.....	860 28
Water-wheels, windmills, etc.	....	.....	1	1,893 70	....	.....	1,893 70
Power-transmission Apparatus.							
Shafts, including pulleys	27	5,110 74	7	7,466 08	....	75 00	12,651 82
Set-screws	6	667 76	....	.....	....	75 00	742 76
Belts	65	6,007 72	6	5,334 67	4	20,818 14	32,160 53
Chains and sprockets	2	54 93	1	228 12	....	.....	283 05
Cables	16	2,017 48	1	1,522 22	1	652 62	4,192 32
Gears	37	3,349 93	12	7,330 76	....	.....	10,680 69
Power-driven Machinery.							
Cement-making machinery	1	182 87	....	.....	....	.....	182 87
Cement-mixers	1	6 60	....	.....	....	.....	6 60
Metal-working—							
Abraisive wheels	24	652 15	2	1,002 77	....	.....	1,654 92
Milling or drilling machines	87	2,654 49	4	3,676 43	....	75 00	6,405 92
Power-hammers	5	740 21	1	93 25	....	.....	833 46
Lathes	19	1,527 08	3	810 49	....	.....	2,337 57
Planers	5	296 92	1	107 98	....	.....	404 90
Riveters	41	1,048 74	....	.....	....	.....	1,048 74
Welding and heat cutting	4	38 48	....	.....	....	.....	38 48
Can-making machinery	13	277 39	4	207 18	....	.....	484 57
All other metal-working machinery	13	739 10	3	592 01	....	.....	1,331 11
Wood-working—							
Shingle-machines	187	15,106 96	46	16,209 74	1	4,280 12	35,596 82
Sawmill-machines	225	20,133 74	52	39,234 65	3	14,985 73	74,354 12
Portable power-saws, gasolene, etc.	4	396 95	....	.....	....	.....	396 95
All other power-saws	89	5,180 59	25	13,164 15	....	.....	18,344 74
Edgers	3	72 33	....	.....	....	.....	72 33
Planing-mill machinery	56	3,824 23	12	3,962 19	1	5,807 45	13,593 87
Cooperage machinery	2	51 98	....	.....	....	.....	51 98
All other wood-working machinery	24	1,364 92	5	1,308 38	....	.....	2,673 30
Paper-making machinery	49	2,675 22	3	771 55	1	4,529 68	7,976 45
Printing-presses and printing machinery	15	431 68	1	136 94	....	.....	568 62
Book-binding machinery	2	234 59	1	93 31	....	.....	327 90
Leather-working machinery	3	86 66	....	.....	....	.....	86 66
Textile and laundry machines	13	165 73	1	37 92	....	.....	203 65
Baking-machines	5	265 41	1	104 95	....	.....	370 36
Confectionery and sugar-refining machinery	3	39 85	1	302 11	....	.....	341 96
Food-products machinery	12	606 54	7	1,757 28	....	.....	2,363 82
Shipyard machinery (N.E.S.)	6	344 41	2	125 14	....	.....	469 55
Power-driven machinery (N.E.S.)	38	2,754 54	7	6,778 85	....	.....	9,533 39

Hoisting Apparatus and Conveyors.							
Logging operations (hoisting and conveying apparatus)	156	14,051 70	8	5,133 16	1	4,166 03	23,350 89
Elevators (not construction)	19	2,488 13	1	1,241 06	....	75 00	3,804 19
Cranes and derricks	32	2,662 95	1	153 16	1	2,077 42	4,893 53
Blocks, tackles, capstans, winches, cables, etc. (N.E.S.)	128	10,013 65	14	4,517 48	1	4,605 23	19,136 36
Hoisting apparatus and conveyors (N.E.S.)	47	3,871 76	2	768 01	1	8,961 52	13,601 29
Miscellaneous Machinery.							
Pump	5	186 91	2	240 17	....	.....	427 08
Pile-drivers	9	1,103 54	2	415 30	....	75 00	1,593 84
Miscellaneous machinery	7	613 03	1	80 31	....	.....	693 34
Boilers and Steam- and Air-pressure Apparatus.							
Steam-boilers (all accidents)	3	537 41	....	.....	1	5,279 88	5,817 29
Steam-pipes or water-gauges (all accidents)	9	280 87	1	1,171 19	....	75 00	1,527 06
Steam-pressure apparatus	2	307 34	1	212 12	....	75 00	594 46
Air-pressure apparatus	5	358 60	1	310 16	....	.....	668 76
Vehicles and Water Transportation.							
Train wrecks, collisions, or derailments	13	1,094 96	1	157 96	4	20,811 98	22,064 90
Falls from trains or locomotives	69	5,079 48	3	3,060 16	....	75 00	8,214 64
Struck or run over by trains or locomotives	13	5,037 79	6	12,333 75	2	13,039 58	30,411 12
Coupling railway-cars	11	1,950 87	2	3,353 68	....	.....	5,304 55
Other railway causes	46	3,652 30	2	295 22	2	5,972 00	9,919 52
Street-railway collisions or derailments	1	42 44	....	.....	1	5,835 02	5,877 46
Falls from street-cars	3	126 23	....	.....	....	.....	126 23
Struck by or run over by street-cars	3	174 25	....	.....	....	.....	174 25
All other street-car causes	4	162 75	....	.....	....	.....	162 75
Logging railways or locomotives	48	4,241 27	3	1,404 69	1	841 22	6,487 18
Mine, quarry, others cars or locomotives	311	24,065 86	9	7,584 01	4	25,690 57	57,340 44
Hand-trucks or barrows, etc	124	7,578 50	4	1,474 05	....	.....	9,052 55
Automobiles and motor-cycles (collisions)	10	1,732 70	2	2,648 59	....	.....	4,381 29
Automobiles and motor-cycles (skids and side-slips)	7	432 19	....	.....	1	6,433 53	6,865 72
Automobiles and motor-cycles (back-fire while cranking engine)	76	4,365 96	1	1,067 82	....	.....	5,433 78
Automobiles and motor-cycles (all other accidents)	74	8,702 35	7	14,560 09	....	75 00	23,337 44
Animal-drawn vehicles	65	4,914 51	3	1,522 56	....	.....	6,437 07
All vehicles (N.E.S.)	7	624 66	....	.....	1	5,458 46	6,083 12
Water transportation (accidents incidental thereto)	16	2,376 37	....	.....	....	.....	2,376 37
Explosives. Electricity, Fire, Hot or Corrosive Substance.							
Explosives (manufacturing and storing)	1	21 76	....	.....	....	75 00	96 76
Explosives (blasting accidents)	28	3,852 37	6	7,389 43	5	23,326 47	34,568 27
Explosives (other causes)	3	859 35	1	661 36	....	.....	1,520 71
Explosions, mines only (coal, dust, gas, etc.)	5	831 11	2	12,344 61	....	.....	13,175 72
Explosions of molten metals	22	2,243 01	4	7,049 70	....	.....	9,292 71
Molten metals (other accidents)	33	2,888 25	1	349 27	....	.....	3,237 52
All other explosions (except steam), including gas or gasolene, etc	30	1,504 61	....	.....	2	12,297 22	13,801 83
Electricity	17	680 07	....	.....	....	75 00	755 07
Fire	18	720 67	....	.....	....	.....	720 67
Forest fires	4	338 48	....	.....	....	.....	338 48
Fire and heat (N.E.S.)	63	2,293 07	....	.....	....	.....	2,293 07
Scalding water, steam (N.E.S.)	39	2,277 94	1	1,100 00	....	.....	3,377 94
Hot asphalt, pitch, or tar	18	855 89	....	.....	....	.....	855 89
Acids and caustics	19	549 46	....	.....	....	75 00	624 46
Lime	3	46 50	....	.....	....	.....	46 50
Carried forward							

TABLE C.—STATEMENT SHOWING THE CAUSES OF ALL FINALLED ACCIDENTS DURING 1920—*Continued.*

Cause of Accidents.	T.T.D.		P.P.D.		FATALS.		Total.
	No. of Accidents.	Payments.	No. of Accidents.	Payments.	No. of	Payments.	
Brought forward	....	.....	....	.....	....	.....	... .
Falls of Persons.							
From scaffolds and stagings	53	3,241 14	2	1,367 56	1	6,371 15	10,979 85
Collapse of scaffold	53	5,056 42	3	1,597 97	....	. . ....	6,654 39
Collapse of support	63	5,672 07	1	367 73	1	7,513 28	13,553 08
From ladders or stairs	109	11,387 50	4	5,393 35	....	.....	16,780 85
From machinery or trucks	121	8,600 79	4	4,905 36	....	.....	13,506 15
From boats and vessels under construction	6	881 39	....	.....	....	.....	881 39
From buildings under construction or demolition	25	3,157 21	1	677 41	....	75 00	3,909 62
All other falls from a height	213	19,038 52	5	5,401 29	3	20,658 65	45,098 46
Into excavations, pits, or shafts, etc	73	3,656 67	....	.....	....	.....	3,656 67
Into hot liquids, vats, etc	1	9 90	....	.....	....	.....	9 90
Falls (slipping or stumbling)	1,091	57,447 27	7	10,347 12	....	572 48	68,366 87
Falling, Rolling, or Moving Objects.							
Falling overhead coal or rock (in mine)	395	42,464 11	22	22,219 41	5	28,658 76	93,342 28
Falling overhead coal or rock (not in mine)	76	4,719 28	1	625 80	1	3,800 52	9,145 60
Falling overhead material (not in mine)	41	1,607 47	2	789 57	1	5,383 46	7,780 50
Falling timber, lumber, etc	639	38,661 14	20	16,021 65	4	16,541 94	71,224 73
Falling trees	209	26,515 79	10	13,864 06	9	59,974 61	100,354 46
Rolling or moving logs	441	45,116 05	17	12,846 33	6	31,066 93	89,029 31
Slide or cave-in	23	3,092 42	1	1,500 57	2	10,719 52	15,312 51
Snowslide	1	1,525 95	2	2,499 82	....	75 00	4,100 77
Flying objects	394	21,515 27	26	22,429 44	....	225 00	44,169 71
Falling objects from trucks	203	12,866 14	5	3,294 79	1	6,854 31	23,015 24
Falling, rolling, or moving objects	502	34,219 05	19	13,796 38	2	11,700 90	59,716 33
Miscellaneous.							
Handling lumber, timber, etc	311	14,090 96	12	1,353 95	....	75 00	15,519 91
Handling heavy machinery or heavy objects	365	15,713 12	14	4,375 68	....	.....	20,088 80
Handling wire, cables, sheet metals, and similar substances (N.E.S.)	179	6,150 82	1	143 25	....	.....	6,294 07
Lifting	296	13,993 40	1	197 74	....	.....	14,191 14
Caught on or struck against nail or sharp projection	571	20,391 78	8	2,123 78	1	5,647 53	28,163 09
Door shutting	44	1,317 17	....	... .	....	.....	1,317 17
Cut by glass	49	1,308 48	1	149 68	....	.....	1,458 16
Cut with axe or adze	611	29,000 06	21	4,076 80	....	75 00	33,151 86
Injured by pick or peavey	92	2,737 28	....	.....	....	.....	2,737 28
Hand-saws	222	8,090 79	2	572 07	....	.....	8,662 86
Stepping on nail, etc	111	1,760 48	...	.....	....	.....	1,760 48
Inhalation of poisonous gas	3	103 56	....	.....	....	.....	103 56
Lead poisoning	51	2,098 65	1	1,957 26	....	.....	4,055 91
Cedar poisoning	13	842 65	....	.....	....	.....	842 65
Sulphur poisoning	2	215 07	....	.....	....	.....	215 07
Poisons (N.E.S.)	5	533 10	2	869 04	....	.....	1,402 14
Hand-tools (N.E.S.)	406	14,901 53	11	1,608 86	1	5,561 49	22,071 88
Drowning	....	.....	....	.....	12	43,500 62	43,500 62
Accidents by animals, insects, reptiles, etc	161	10,187 84	3	676 88	1	1,331 63	12,196 35
Tools, etc., in the hand of fellow-workman	168	7,357 59	3	1,808 82	....	... .	9,166 41
Accidents not elsewhere classified	12	588 78	....	.....	3	21,326 90	21 915 68
	11,166	$716,481 87	537	$367,011 16	93	$484,629 55	$1,568,122 58

TABLE D.—PARTS OF THE BODY INJURED AND CLASSIFICATION COVERING 11,166 TEMPORARY DISABILITY CASES.

No. of Accidents.	Location of Injury. Part of Body.	Right.	Left.	Both.	Nature of Injury. Infection.	Bruise or Crush.	Cut or Laceration.	Puncture.	Sprain or Strain.	Fracture.	Dislocation	Amputation.	Scald or burn.	Miscellaneous.	Class No. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Amount.
59	Abdomen	....	....	..	....	38	1	....	17	..	....	....	....	3	25	....	6	3	2	6	6	1	2	3	....	1	....	1	....	1	2	..	..	$ 4,875 04
563	Ankle	280	277	6	13	104	28	4	379	33	9	.	6	....	267	5	55	33	15	19	62	6	16	39	2	10	6	10	4	1	11	2	..	35,678 09
597	Arm	328	262	7	68	164	137	26	46	164	14	4	39	3	267	20	42	23	24	44	76	7	13	19	2	3	11	8	3	8	25	1	1	50,628 74
504	Back	....	....	..	2	197	10	2	287	....	1	....	4	3	157	11	80	37	18	10	78	6	17	40	4	9	7	10	3	..	15	2	..	26,117 04
104	Chest	36	37	31	....	84	5	...	13	....	....	....	1	1	39	2	17	3	1	4	16	2	4	7	1	....	3	1	....	..	4	..	..	4,966 63
23	Collar-bone	12	11	..	....	....	....	....	....	23	....	....	....	....	9	1	3	1	....	....	4	....	....	2	1	....	....	....	....	..	2	..	..	2,545 69
15	Ear	8	7	..	...	2	13	....	....	....	....	....	....	....	6	2	1	....	....	3	2	....	....	....	....	....	....	....	1	..	....	..	..	404 01
1	Ear-drum	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	..	..	105 48
420	Eye	207	191	22	33	97	113	6	....	....	1	....	53	150	120	6	38	63	28	11	84	6	5	31	2	7	7	3	4	..	4	1	..	21,183 73
9	Eyelid	2	1	6	1	1	5	....	....	....	....	....	2	1	4	....	..	2	....	....	2	....	....	....	....	....	1	....	....	....	....	....	..	710 20
145	Face	....	....	..	13	22	74	2	....	4	....	....	39	4	56	1	12	14	4	5	17	3	4	11	3	3	1	4	5	..	....	2	..	5,583 54
1,502	Fingers (1)	773	729	..	459	352	761	160	6	127	3	72	13	8	611	84	109	81	72	109	174	10	44	69	4	15	19	16	29	5	42	7	2	62,725 38
307	Fingers (2)	138	167	2	36	77	193	2	4	7	1	14	7	2	123	24	24	16	21	18	39	3	7	15	....	1	....	4	1	1	8	1	1	14,547 32
86	Fingers (3)	45	38	3	9	23	49	1	....	....	1	8	4	....	43	13	2	2	6	2	4	....	1	4	....	1	....	1	2	1	3	..	1	7,986 68
18	Fingers (4)	9	6	3	....	4	7	....	....	1	6	....	....	....	13	3	....	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	..	1,946 20
983	Foot	513	465	5	102	378	229	144	76	130	5	5	16	....	450	13	83	54	20	34	135	7	44	56	6	11	15	15	11	3	18	6	2	60,264 07
28	Groin	12	16	..	....	19	1	....	6	....	....	....	....	2	9	....	6	....	2	....	5	....	....	1	1	....	1	....	....	....	3	2	..	1,356 89
900	Hand	444	431	25	283	152	452	157	17	43	2	2	60	15	389	36	57	57	41	48	108	18	25	41	8	12	12	13	9	1	21	4	..	37,594 10
350	Head	....	....	..	16	58	259	1	2	21	....	....	....	9	144	6	43	26	11	8	56	1	3	26	...	5	5	4	3	..	7	..	2	16,566 08
149	Hip	59	76	14	2	104	6	1	24	4	8	2	....	....	51	3	19	11	1	7	21	3	5	8	....	2	4	4	1	..	5	3	1	10,660 87
19	Jaw	....	....	..	1	3	4	1	....	10	1	....	....	....	9	....	1	2	1	....	3	....	....	1	....	....	....	....	....	1	..	1	..	..	1,934 09
581	Knee	307	262	12	42	231	112	31	185	7	13	....	2	....	264	10	62	17	8	18	77	6	24	36	4	8	8	13	8	2	12	4	..	36,065 56
924	Leg	431	463	30	96	357	205	28	39	269	...	6	18	2	474	11	97	31	13	20	97	8	35	51	7	10	17	16	7	1	20	6	3	133,644 66
31	Lip	....	....	..	....	2	29	....	....	....	....	....	....	....	17	....	3	3	....	....	5	....	....	....	1	....	....	....	....	....	....	1	1	..	634 96
2	Loin	....	2	..	....	2	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	..	108 68
3	Lung	1	1	1	....	....	....	1	....	....	....	....	....	2	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	..	125 71
23	Neck	....	....	..	....	10	7	4	....	....	....	....	4	....	5	1	5	1	....	1	4	....	2	3	....	1	1	....	....	..	1	..	..	1,081 30
44	Nose	....	....	..	....	3	9	1	...	30	....	....	1	....	17	1	6	5	1	....	7	...	....	3	....	....	2	....	1	..	....	1	..	1,271 49
16	Pelvis	....	....	..	....	3	....	....	....	9	3	....	....	1	3	1	6	1	....	....	1	....	....	3	....	....	....	1	....	..	....	....	..	5,701 84
6	Perinæm	....	....	..	....	4	1	1	....	....	....	....	....	....	2	....	....	....	....	....	1	....	2	....	1	....	....	....	....	..	....	....	..	799 78
639	Ribs	....	....	..	2	171	6	....	39	420	3	....	....	....	315	11	55	26	8	22	74	10	14	33	5	10	15	4	13	2	17	2	3	33,493 27
9	Scrotum	....	....	..	....	6	2	1	....	....	....	....	....	....	7	....	1	....	....	....	1	....	....	....	....	....	....	....	....	..	....	....	..	760 13
315	Shoulder	156	148	11	5	130	9	2	82	43	39	5	5	....	127	3	44	16	10	8	38	4	5	19	1	7	5	10	1	1	13	1	2	25,472 81
34	Testicle	11	14	5	....	28	4	....	2	....	....	....	....	....	14	1	3	1	2	1	5	2	1	....	....	....	....	1	....	1	..	2	..	..	1,990 77
154	Thigh	79	66	9	6	100	30	8	6	8	....	....	....	2	74	4	18	8	3	5	20	1	6	8	1	1	2	1	....	..	2	..	..	12,520 86
433	Thumb	202	230	1	87	92	217	45	15	39	8	15	1	1	179	28	40	31	15	25	45	4	9	30	1	2	5	4	6	1	7	..	1	17,315 25
28	Thumb and 1st finger	15	11	2	2	3	19	1	....	1	....	2	2	....	15	3	1	....	3	1	4	....	....	....	....	....	....	1	....	....	....	....	..	1,160 50
18	Thumb and 2nd finger	6	10	2	3	1	14	....	....	....	....	....	3	....	9	4	....	....	2	1	1	....	....	1	....	..	....	....	....	....	....	....	..	1,339 08
7	Thumb and 3rd finger	3	3	1	....	....	4	....	....	....	....	3	....	....	4	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	1	....	..	914 10
4	Thumb and 4th finger	1	2	1	....	1	2	....	....	....	....	1	....	....	2	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	..	399 67
521	Toe	258	262	1	37	270	118	12	3	100	6	10	1	1	217	11	54	19	11	7	75	4	38	43	1	9	7	8	1	..	14	1	1	23,388 01
1	Tongue	....	....	..	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	7 70
332	Wrist	164	165	3	26	19	70	16	157	49	3	2	16	....	120	7	25	17	16	21	50	4	12	17	2	7	5	8	4	1	15	..	1	15,224 73
3	Cedar poison	....	....	..	....	....	....	....	....	....	....	....	....	3	3	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	..	353 97
1	Gassed	....	....	..	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	..	38 63
46	Hernia	....	....	..	....	....	....	....	....	....	....	....	7	39	8	....	3	5	1	1	11	1	3	3	1	1	....	1	2	1	4	..	..	7,609 27
49	Leaded	....	....	..	....	....	....	....	....	....	....	....	....	49	....	....	....	1	1	5	....	....	....	42	....	....	....	....	....	....	....	....	..	..	2,061 00
156	Multiple	....	....	..	2	86	14	...	3	6	....	....	27	20	39	3	17	11	3	9	23	3	6	13	....	6	6	4	8	..	5	..	..	24,325 33
2	Shock	....	....	..	....	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	..	..	257 09
11166		....	....	..	1346	3398	3220	659	1408	1548	127	151	333	322	4711	330	1039	622	364	474	1433	120	347	679	58	144	169	165	129	31	284	45	22	$716,481 87

TABLE E.—TABLE COVERING 537 PERMANENT PARTIAL DISABILITY ACCIDENTS, SHOWING NATURE OF INJURY, CLASS, AND COST, 1920.

No. of Accidents.	Location of Injury.				Nature of Injury.	Class No.																		Cash Payment and Reserve.	Average Cost per Accident.
	Part of Body.	Right.	Left.	Both.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
7	Ankle	4	3	....	Impaired	3	....	....	....	....	....	....	1	....	1	....	....	....	1	....	....	1	....	....	$ 3,607 16	$ 515 31
31	Arm	19	12	....	Impaired	13	....	3	2	....	2	2	2	....	3	....	....	1	2	....	1	....	....	....	34,918 81	1,126 41
11	Arm	5	6	....	Amputated	6	1	....	....	....	1	....	....	....	1	....	....	....	....	....	1	....	....	....	33,823 97	3,074 91
6	Back	....	....	....	Impaired	2	....	1	....	....	....	....	....	....	....	....	....	1	....	1	....	1	....	....	....	12,811 02	2,135 17
1	Chest	....	....	....	Impaired	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4,963 19	4,963 19
1	Ear	....	1	....	Hearing impaired	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	249 13	249 13
1	Eyes	....	....	1	Total blindness	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11,190 71	11,190 71
26	Eye	15	11	....	Loss of sight in one eye	6	1	....	5	1	....	6	1	....	2	....	1	....	....	2	....	1	....	....	32,884 36	1,264 78
16	Eye	8	6	2	Impaired	7	....	1	4	1	....	2	....	....	1	....	....	....	....	....	....	....	....	....	10,148 10	634 26
168	Fingers	67	102	....	Loss of one	80	15	7	10	11	11	21	....	2	6	1	1	....	....	1	....	1	1	....	14,801 33	88 10
55	Fingers	26	29	....	Loss of two	23	7	3	2	2	3	8	....	3	1	....	....	....	....	1	....	1	....	1	12,644 59	229 90
16	Fingers	8	8	....	Loss of three	9	4	....	1	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	8,543 12	533 95
8	Fingers	4	4	....	Loss of four	5	....	....	....	....	....	1	....	....	....	....	....	....	....	....	1	1	....	....	8,835 04	1,104 38
27	Foot	11	16	....	Impaired	12	..	6	1	....	....	6	....	....	2	....	....	....	....	....	....	....	....	....	15,327 75	567 69
1	Facial disfigurement	....	....	....		1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	400 00	400 00
18	Hand	8	10	....	Impaired	7	1	....	1	1	1	2	1	....	1	....	1	1	....	1	....	....	....	....	18,609 00	1,033 83
4	Hand	3	1	....	Amputated	3	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10,857 37	2,714 34
1	Kidney	1	....	....	Loss of	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4,474 64	4,474 64
9	Knee	4	5	....	Impaired	1	....	1	1	....	1	3	1	....	1	....	....	....	....	....	....	....	....	....	9,282 85	1,031 43
34	Leg	17	17	....	Impaired	15	..	3	3	1	....	1	1	2	3	1	1	1	....	1	....	1	....	....	29,496 52	867 54
14	Leg	6	8	....	Amputated	5	....	5	....	....	....	....	....	....	3	1	....	....	....	....	....	....	....	....	35,491 67	2,535 12
1	Thigh	....	1	....	Impaired	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	256 36	256 36
13	Thumb	6	7	....	Impaired	4	....	2	....	1	....	3	....	1	....	....	....	....	....	....	....	....	1	1	2,384 60	183 43
21	Thumb	13	8	....	Amputated	11	2	....	2	....	1	2	....	....	1	....	....	....	....	....	....	1	....	1	5,389 17	256 63
6	Thumb and 1st finger	5	1	....	Amputated	4	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	4,593 89	765 65
2	Thumb and 2nd finger	1	1	....	Amputated	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1,707 08	853 54
5	Thumb and 4th finger	3	2	....	Amputated	2	2	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	8,790 45	1,758 09
13	Toe	6	7	....	Loss of one	6	1	....	....	....	....	3	....	....	1	....	....	1	1	....	....	....	....	....	892 66	68 67
11	Toe	7	4	....	Loss of two or more	7	....	1	....	....	1	....	....	1	....	....	....	1	....	....	....	....	....	....	2,539 58	230 87
2	Shoulder	1	1	....	Impaired	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	1	....	....	....	656 92	328 46
2	Wrist	1	....	1	Impaired	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	2,239 28	1,119 64
3	Permanent disability	....	....	....		....	....	....	1	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	10,829 95	3,609 98
2	Permanent total disability	....	....	....		1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	12,920 89	6,460 45
1	Miscellaneous	....	....	....		....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	450 00	450 00
537						235	37	36	34	21	21	61	7	10	30	3	4	8	5	7	3	10	2	3	$ 367,011 16	

Table F.—Duration of Disability and Classification covering 11,166 Temporary Total Disability Accidents, 1920.

(Average Duration of Disability, 30.3.)

Days.	Class No.																			Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
2	1	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	2
3	2	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	4
3½-4	27	4	6	19	6	6	16	....	1	15	....	1	1	3	....	....	....	2	....	107
5	146	7	34	34	9	31	51	....	7	30	2	8	6	4	5	1	11	2	....	388
6	218	21	70	51	24	23	79	7	10	38	5	6	5	7	5	....	12	1	....	582
7	257	14	61	51	38	29	100	10	12	50	4	6	10	10	12	3	20	2	....	689
8	185	11	45	48	21	21	65	10	13	27	2	4	5	7	5	4	13	2	2	490
9	195	12	49	30	23	20	66	3	10	32	1	9	9	8	8	2	14	2	....	493
10	198	16	55	34	16	29	60	5	15	39	4	7	7	6	3	1	20	2	1	518
11	228	18	34	18	23	23	71	5	16	28	2	5	6	5	3	....	15	2	....	502
12	187	20	41	22	15	23	65	2	9	33	....	7	7	7	2	....	16	....	4	460
13	225	20	55	15	13	22	57	4	10	31	3	4	4	5	3	1	7	1	4	484
14	196	7	22	19	20	18	55	4	17	26	2	7	6	8	5	1	7	3	2	425
15	122	8	27	19	6	10	45	8	10	16	3	4	4	6	3	1	9	1	....	302
16	153	6	35	16	13	22	43	4	13	20	2	4	5	4	6	....	7	....	1	354
17	110	10	42	16	9	11	35	6	13	14	2	2	4	8	4	2	5	....	....	293
18	105	6	28	12	9	14	25	5	8	21	1	6	2	....	4	1	14	4	....	265
19	107	5	25	13	8	10	32	1	7	10	1	4	7	3	7	....	8	1	....	249
20	100	7	25	6	9	11	27	1	4	7	....	4	4	5	3	....	8	....	....	221
21	127	5	23	10	4	8	28	2	9	15	5	2	4	5	5	....	4	2	1	259
22	66	4	16	5	2	12	15	2	5	7	2	....	4	2	2	....	5	....	1	150
23	77	4	17	8	4	7	20	3	7	8	2	2	1	3	1	1	3	1	....	169
24	91	9	11	6	4	5	20	2	7	14	....	1	1	2	1	....	3	....	....	177
25	88	8	23	5	1	9	26	1	5	5	....	5	4	6	3	1	2	3	1	196
26	69	6	9	11	4	5	13	1	7	10	....	2	3	3	2	....	5	....	....	150
27	69	6	12	7	4	11	24	....	4	9	....	2	2	....	1	....	3	2	....	154
28	53	2	9	6	3	9	20	3	7	8	1	1	2	2	2	....	2	....	....	130
29	48	2	5	10	1	2	16	....	5	8	1	1	3	....	1	....	3	....	....	106
30	52	5	14	6	5	3	8	3	3	3	....	4	....	2	1	....	2	....	....	111
31	46	2	6	5	4	8	15	....	3	2	....	....	2	3	2	....	....	1	....	99
32	43	5	12	2	5	7	17	....	8	5	....	1	2	2	1	....	4	....	1	115
33	46	2	13	6	4	4	12	....	3	5	....	....	1	1	1	....	....	....	....	98
34	37	4	9	6	2	4	8	....	1	4	....	....	3	2	....	1	1	....	....	82
35	48	1	8	3	2	3	14	1	5	5	....	2	2	....	1	....	3	....	....	98
36	38	1	2	2	3	3	11	....	1	5	1	3	1	....	1	....	4	1	....	77
37	27	2	5	5	2	3	12	1	5	6	....	1	2	....	....	2	....	....	....	73
38	39	2	5	2	3	4	6	2	4	3	....	....	2	....	1	....	3	....	....	76
39	32	3	4	2	....	1	6	2	3	2	....	....	....	2	1	....	3	....	....	61
40	27	3	2	4	2	1	12	1	3	2	....	1	2	1	....	....	3	....	....	64
41	31	1	6	2	2	1	8	....	1	6	1	2	2	1	....	....	....	....	1	65
42	19	3	6	2	1	2	10	1	2	3	....	4	....	1	....	....	1	2	....	57
43	22	1	3	2	1	....	8	2	2	1	....	2	....	3	....	....	5	1	....	53
44	25	5	5	4	4	....	9	....	1	1	1	2	1	2	....	....	2	1	....	63
45	14	....	3	2	....	....	7	....	....	2	....	....	....	....	1	....	3	....	1	33
46	21	4	3	3	....	1	7	....	....	4	1	1	2	2	1	....	4	....	1	55
47	18	4	3	4	1	1	3	....	3	3	....	1	1	....	....	....	1	....	....	43
48	22	4	5	3	1	2	5	4	3	4	....	....	1	1	1	....	2	....	....	58
49	19	....	3	2	1	1	5	....	2	4	....	....	1	1	....	....	1	....	....	40
50	6	....	1	4	....	1	3	....	3	....	....	2	....	....	1	....	2	....	....	23

TABLE F.—DURATION OF DISABILITY AND CLASSIFICATION covering 11,166 TEMPORARY TOTAL DISABILITY ACCIDENTS, 1920—*Continued.*

(Average Duration of Disability, 30.3.)

Days.	Class No.																			Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
51	914	3	5	2	3	2	8	....	4	1	....	1	1	....	....	....	1	....	....	45
52	9	2	1	1	1	1	5	1	2	....	....	....	2	1	....	....	1	1	1	29
53	12	3	2	1	1	2	8	....	2	2	1	2	1	1	2	1	....	....	....	41
54	19	....	2	3	3	....	6	....	2	....	....	....	....	....	....	....	....	....	....	35
55	15	1	2	1	....	1	4	....	....	....	1	....	3	....	....	....	1	....	....	29
56	17	1	2	2	....	....	4	1	1	3	1	1	....	....	1	1	1	....	....	36
57	12	1	1	....	1	....	2	....	1	1	....	1	1	1	....	....	....	....	....	22
58	13	1	....	1	....	....	6	....	2	3	....	....	....	....	1	....	....	....	....	27
59	17	....	2	....	1	2	5	....	1	1	1	....	....	....	....	....	1	....	....	31
60	11	....	2	1	3	1	5	....	3	2	....	....	1	....	1	....	....	....	....	30
61	12	1	1	1	....	....	3	....	2	....	....	....	....	1	....	1	1	....	....	23
62	15	2	3	....	1	1	2	....	....	1	....	....	....	....	1	....	....	....	....	26
63	10	2	2	2	....	....	1	....	....	3	1	1	....	....	....	....	1	....	....	23
64	12	....	2	....	1	2	2	....	2	3	....	....	....	1	....	....	2	....	....	27
65	6	2	1	1	1	....	1	2	....	3	....	....	1	....	....	....	....	....	....	18
66	11	1	2	....	....	2	7	....	....	3	....	....	1	....	1	....	....	....	....	28
67	12	....	2	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	17
68	5	....	2	2	1	....	3	....	1	1	1	1	1	....	1	....	....	....	....	19
69	9	....	1	....	....	1	2	....	1	2	....	1	....	1	....	....	....	....	....	18
70	5	....	3	1	....	....	2	....	1	....	....	....	....	1	....	1	....	....	....	14
71–80	68	5	15	4	2	2	18	....	10	6	....	1	2	3	4	3	3	....	....	146
81–90	56	3	11	6	1	7	11	....	3	7	....	1	2	....	1	....	2	....	....	111
91–100	34	3	7	1	1	1	17	2	1	4	....	....	1	1	2	1	....	....	....	76
101–150	123	5	25	18	4	1	22	3	8	14	1	4	4	6	2	1	2	3	....	246
151–200	47	2	9	4	3	3	6	2	6	14	1	....	2	2	2	....	4	....	....	107
201–300	41	1	19	4	2	1	11	1	3	8	1	....	2	3	....	....	4	1	....	102
301–400	15	....	8	1	....	1	5	....	3	3	....	....	2	....	1	....	....	....	....	39
401–500	4	1	4	1	....	....	3	....	1	1	....	....	1	....	....	....	....	1	....	17
501–600	3	....	2	1	1	2	....	1	....	....	....	....	....	....	....	....	....	....	....	10
601–700	3	....	....	....	....	....	....	1	....	1	....	....	....	....	....	....	....	....	....	5
701–800	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3
851	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1
1,004	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	1
	4,711	330	1,039	622	364	474	1,433	120	347	679	58	144	169	165	129	31	284	45	22	11,166

HEALTH INSURANCE.

Another year has added a considerable amount of evidence to our already large accumulation showing the necessity of a health-insurance measure.

During the year a great many interviews were had with workmen who were desirous of securing medical treatment for disabilities, some of which were alleged to have arisen out of and in the course of their employment, but which were not compensable.

A large number of workmen have urged the Board to make an additional charge to the present statutory deduction from their wages of 1 cent a day in order that their families as well as themselves might be provided with medical attention. It was with difficulty that it was explained that we were without authority to meet their wishes.

After all, health insurance merely proposes to take the entire cost of sickness and distribute it equitably over the factors which cause it and which suffer by it. There is no added cost, but merely an equitable distribution of existing costs. Such a scheme will afford a very powerful stimulus to employers, workmen, and public men to take fuller and speedier advantage of possible health-saving devices. The health movement can be far more potent than the accident-prevention movement, because sickness is more prevalent and more preventable than accidents.

The present method of ignoring the great problem of illness among workmen and their families until actual destitution demands public attention is socially wasteful in the extreme. It means a heavy financial burden on public funds for relief, to say nothing of the mental attitude that it forces the distressed ones to assume toward society.

Attention to the health of the workman will mean the prolongation of his life, and especially of its earning period. Fewer workmen will be thrown on the scrap-heap in their forties, with all the tragic consequences involved to their families as well as to themselves.

Such a movement would help forward industrial peace, for it would create machinery for frequent conferences between employers and workmen.

We again wish to bear public testimony to the loyal and efficient services rendered by the various members of the staff. To their energetic co-operation is due, to a great extent, the successful working-out of the Act.

Respectfully submitted.

PARKER WILLIAMS.
HUGH B. GILMOUR.
E. S. H. WINN, *Chairman.*

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF INDUSTRIES

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Second Annual Report of the Department of Industries of this Province is herewith respectfully submitted.

JOHN OLIVER,

Premier.

Premier's Office,

February 9th, 1921.

DEPARTMENT OF INDUSTRIES,

VICTORIA, B.C., February 9th, 1921.

The Honourable John Oliver, Premier,

Minister of Industries, Victoria, B.C.

DEAR SIR,—In pursuance of section 9 of the "Department of Industries Act," I enclose herewith Annual Report.

Yours truly,

D. B. MARTYN,

Industrial Commissioner.

Report of the Department of Industries.

To the Lieutenant-Governor in Council, Victoria, B.C.

Sir,—In accordance with the "Department of Industries Act," the following report is made. It contains:—

(*a.*) Organization:
(*b.*) Research-work:
(*c.*) Summary of Applications received:
(*d.*) Loans granted:
(*e.*) Statement of Repayments and Interest Overdue:
(*f.*) Classification of Applications:
(*g.*) Financial Statement showing the Disbursements from the Development Fund:
(*h.*) Industrial Summary of Provincial Industries:
(*i.*) Report of Nichol Thompson on the Markets for Iron and Steel:
(*j.*) Classification of British Columbia Industries.

(*a.*) Organization.

The Department of Industries as at present organized consists of the Minister of Industries, the Honourable John Oliver; a Deputy Minister, known as the Industrial Commissioner, Major Donald B. Martyn; and an Advisory Council to the Industrial Commissioner, acting without pay, who are: Major R. J. Burde, M.C., M.P.P., Port Alberni; F. G. Dawson, Prince Rupert; Joshua Kingham, 1004 Broad Street, Victoria; James H. McVety, Labour Temple, Vancouver; J. E. W. Thompson, c/o Restmore Manufacturing Co., Vancouver; Nichol Thompson, 847 Beatty Street, Vancouver.

The Advisory Council of the Department of Industries held five meetings during 1920 to consider the applications for loans made to the Department; a complete summary of them is embodied in this report.

(*b.*) Research-work.

During the year 1920 considerable activity has been manifested in developing the iron and steel industry on the Pacific Coast. There are several syndicates in the field making surveys of the ore flux and fuel. The Department has co-operated in every instance, and to complete the information at present available in respect to markets, the Department had Mr. Nichol Thompson, a member of the Advisory Council, make a survey of the Coast markets and collect data in respect to possible export markets. He reports a present market on the Pacific Coast for 1,000 tons of pig-iron per day, sufficient to absorb the output of blast-furnaces of considerable size. A copy of this report is included herein.

During the year the Department made a survey and list of the various industrial plants in operation in the Province and prepared a summary of the number of firms engaged in each industry, the wages paid, the number of employees, and the average wage. As an addition to this a complete list of the industries of British Columbia has been compiled showing the nature and location. Copies of this summary and list are attached.

The large number of applications coming under the review of the Advisory Council of the Department, which in their opinion did not possess a reasonable prospect of success, prompts them to recommend the introduction at an early date of a blue-sky law. In many cases applications were submitted in respect to industries where the promotion could be placed in the category of a wild-cat promotion. It is the opinion of the Advisory Council that the industrial development of the Province would be furthered by a blue-sky law.

(*c.*) Summary of Applications received.

Total number of applications under advisement at Dec. 31st, 1919	6
Total number of applications under investigation at Dec. 31st, 1919	45
Total number of applications received to end of Dec. 31st, 1920 ..	362
Total amount applied for during 1920	$3,044,050.00
Total amount of loans approved	$630,658.48
Total amount of loans under advisement	$75,000.00
Total number of applications refused	306
Total number of applications granted	60
Total number of applications under advisement	4
Total number of applications under investigation	43

(*d.*) LIST OF LOANS APPROVED.

Name.	Industry.	Location.	Loan.	Total Amount to be expended in the Industry.	Expected to employ.
E. J. Wakefield	Willow holt	North Vancouver	$ 1,500 00	$ 4,500 00	2
Vancouver Island Fish & Cold Storage Co.	Fish-curing	Nanaimo	7,500 00	28,500 00	4
Wholesale Fish Co.	,,	Victoria	2,500 00	5,500 00	7
H. Thompson *et al.*, operating as the Green River Lumber Co.	Sawmill	Rethel	12,000 00	18,000 00	42
Veterans' Products Co.	Fish-fertilizer	Victoria	15,000 00	25,000 00	15
Vivian Gas Engine Works	Gas-engines	Vancouver	20,000 00	49,408 00	20
Ordano Bros.	Boat-building	Cowichan Bay	1,400 00	3,750 00	5
Henson & Dyson	Concrete blocks	Victoria	4,000 00	8,708 00	12
Acme Box Co.	Wooden boxes	Vancouver	6,000 00	9,000 00	15
Canada Silica Works, to be known as the Canada Abrasive Paper Co.	Sandpaper	Victoria	22,000 00	44,000 00	16
Aetna Saw Works, Ltd.	Saws	Vancouver	15,000 00	48,100 00	8
Great West Manufacturing Co.	Cut-to-fit houses	,,	15,000 00	25,000 00	12
Pacific Guano Co., Ltd.	Fish oil and meal	,,	5,000 00	29,000 00	7
N.M. & R. Fish Co.	Fish company	Prince Rupert	25,000 00	38,000 00	23
B.C. Coast Fisheries	,,	New Westminster	15,000 00	25,000 00	10
Canadian Western Woollen Mills	Woollen-mills	Vancouver	30,000 00	80,000 00	30
Stettler Cigar Factory, Ltd.	Cigar-factory	,,	25,000 00	67,340 00	125
Thomas & Julian Fisheries	Fish company	,,	12,500 00	20,000 00	10
Pacific Crating & Manufacturing Co.	Box-shooks and crating	Sidney Island	10,000 00	32,000 00	30
Canada Dolls, Ltd.	Toys	Vancouver	7,500 00	15,675 00	15
Laidlaw Shingle Co., Ltd.	Shingles	Squawtits Island	4,900 00	10,000 00	20
Alberni Shingle Co., Ltd.	,,	Port Alberni	11,000 00	17,500 00	15
Ceramic Industries, Ltd.	Bricks	Vancouver	15,000 00	36,589 00	30
Dominion Woodworkers	Wood-workers	,,	1,500 00	3,500 00	6
Erskine & May	Sawmill	Merville	6,500 00	8,500 00	15
Heaton Machine Works	Machinery	Vancouver	5,000 00	11,897 81	6
McLeod & Movitz	Sawmill	Courtenay	2,500 00	5,000 00	8
Merritt Industries	.....	Merritt	7,500 00	14,623 92	..
Jorgensen & Anthony	Canned goods	Vancouver	500 00	1,500 00	2
Maddaugh, Huggard & Nichols	Sawmill	Langley Prairie	26,658 48	32,500 00	30 to 40
Electrical Manufacturing Co.	Electrical appliances	Vancouver	5,700 00	15,000 00	10
B.C. Yacht & Boat Builders	Boat-building	Victoria	15,000 00	22,000 00	40
Wonder Pump & Engine Co.	Pumps and engines	Vancouver	10,000 00	26,000 00	10
Hiker Manufacturing Co.	Children's mechanical vehicles	Victoria	8,000 00	19,000 00	17
McBride-Wells Co.	Labelling and reconditioning of canned goods	Vancouver	1,000 00	1,400 00	9
Vancouver Knitting Co.	Woollen goods	,,	19,000 00	123,753 91	66

Name.	Industry.	Location.	Loan.	Total Amount to be expended in the Industry.	Expected to employ.
P. E. George	Gramaphones	Victoria	$ 2,000 00	$ 3,005 27	2
John Arnot & Sons	Wood-workers	Vancouver	2,500 00	10,116 00	12
J. R. Tacey & Son	Sheet-metal works	,,	15,000 00	44,823 00	10
Reynolds & Coote	Shingle-mill	Mission	10,000 00	18,000 00	12
T. H. Waters & Co.	Wood-workers	Nelson	15,000 00	44,300 00	14
Standard Shoe Manufacturing Co.	Boots and shoes	Vancouver	15,000 00	22,000 00	20
H. L. Johnson	Antique furniture	Victoria	300 00	922 00	2
San Juan Box Co.	Boxes	Port Renfrew	25,000 00	40,000 00	22
Vancouver Pickle Co.	Pickles	Vancouver	5,000 00	36,000 00	20
B.C. Nurseries	Fruit-tree raising	Sardis	7,500 00	40,500 00	25
Victory Attachable Rubber Soles & Heels Co., Ltd.	Rubber soles and heels	Victoria	2,000 00	8,300 00	3
Western Toy & Furniture Manufacturing Co.	Furniture and toys	Vancouver	15,000 00	53,500 00	30
Kerr Manufacturing Co.	Neckwear	,,	2,000 00	5,000 00	10
Pacific Standard Motor Works, Ltd.	Engines	,,	3,000 00	9,500 00	6
Canadian Western Woodworkers	Wood-working	Victoria	5,000 00	31,000 00	20
Raemaekers & Stephen Bros.	Manufacturing agents	Vancouver	1,500 00	4,500 00	3
T. J. Shore Bolt & Nut Manufacturing Co., Ltd.	Bolts and nuts	,,	45,000 00	138,000 00	20
Henshall Fish Products	Fish by-products	Sooke	3,000 00	6,800 00	6
Schaake Co., Ltd.	Machinery	Vancouver	50,000 00	192,000 00	80
Sayward Trading Co.	Sawmill	Sayward	5,000 00	5,000 00	10
Kelley-Johnson Lumber Co.	,,	Sooke	6,500 00	19,500 00	18
Bird & Gray	,,	Saltspring Island	3,500 00	3,500 00	10
E. R. Crumner	Broom-protectors	Vancouver	200 00	500 00	1

Total amount for new industrial development subscribed by the company and by loan from the Government $1,662,011 91

Total number of persons for which new permanent employment will be provided 1,047 to 1,057

(*e.*) STATEMENT OF REPAYMENTS AND INTEREST OVERDUE.

Principal overdue	$4,883 37
Interest overdue	351 94
Total	$5,235 31

(*f.*) CLASSIFICATION OF APPLICATIONS.

Industry.	Under Advisement.	Under Investigation.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Saw and shingle mills	2	8	50	10	..	7
Garage, etc.	..	..	7	..	..	..
Furniture	..	1	9	3	..	..
Boots and shoes	..	1	4	1	..	..
Toy-factories	..	..	2	2	..	..
Cut-to-fit buildings	..	..	1	1	..	..
Wood-workers	..	1	5	4	..	..
Iron-workers and machinery plants	..	2	23	7	..	6
Fish packing and curing	..	4	6	5	..	2
Other fishing proposals	..	1	32	..	..	2
Fish by-products plants	..	2	2	3	..	1
Ladies' and children's wear	..	..	3	..	..	..
Neckwear	..	..	1	1	..	..
Wood and coal	..	..	4	..	..	..
Trucking	..	..	12	..	..	..
Boat-building	..	4	3	2	..	..
Boat-hiring	..	..	5	..	..	..
Greenhouses and nurseries	..	1	5	..	..	2
Box-factories	..	1	5	2	..	1
Manufacturing electrical fixtures	..	..	3	1	..	..
Bakeries	..	..	2	..	..	..
Groceries	..	..	4	..	..	..
Gloves	..	..	2	..	..	2
Logging	..	1	14	..	..	1
Fruit-canneries	..	2	6	..	..	1
Woollen-factories	..	1	4	1	..	1
Broom-handles	..	..	2	..	..	1
Phonographs	..	..	3	1	..	..
Glass-works	..	..	3	..	..	..
Patent rights	..	1	5	..	..	1
Canoe-factory	..	..	1	..	..	..
Bottling-works	..	..	1	..	..	1
Saws	..	..	2	1	..	..
Paper bags	1	..	..	..	1	..
Brick plants	..	2	2	1	..	..
Slate	..	..	1	..	..	1
Cooperage	..	..	2	..	..	..
Turpentine	..	..	1	..	1	..
Eau de Cologne	..	..	1	..	..	1
Invention *re* sunken vessels	..	..	1	..	..	..
Upholstery	..	..	1	..	..	..
Dyeing	..	..	1	..	..	..
Plating-works	..	..	2	..	..	..
Polishes	..	..	1	..	..	..
Tailoring	..	..	1	..	..	..
Manufacturing new food	..	..	1	..	..	..
Transfer of equity in manufacturing concern	..	..	1	..	..	..
Sifter-spout	..	..	1	..	..	..
Brokerage business	..	..	1	..	..	..
Seeds	..	..	1	..	..	1
Sausage-factory	..	..	1	..	..	..
Carried forward	3	33	251	46	2	32

(*f.*) CLASSIFICATION OF APPLICATIONS—*Continued.*

Industry.	Under Advisement.	Under Investigation.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Brought forward	3	33	251	46	2	32
Hair dyes	..	..	1	..	..	..
Auto knitters	..	..	1	..	..	..
Purchase of stock	..	..	8	..	..	..
Trading	..	..	2	..	..	..
Motor transportation	..	..	2	..	..	..
Importers and exporters	..	..	1	..	..	..
Survey-work	..	..	1	..	..	..
Commercial agencies	..	..	1	..	..	..
Restaurant	..	..	1	..	..	..
Electric culture of farm produce	..	..	1	..	..	..
Cleaning and pressing	..	..	1	..	..	..
Fish-peddling	..	..	1	..	..	..
Commission agent	..	..	1	..	..	..
Steam-shovel	..	..	1	..	..	..
Pool-room	..	..	1	..	..	..
Manufacturing men's clothing	..	..	1	..	..	1
Iron-pipe foundry	..	..	1	..	..	..
Merritt industries	..	..	1	1	..	..
Baby-carriages	..	..	1	..	1	..
Pickles	..	..	2	1	..	..
Spruce products	..	..	1	..	..	..
Steel	..	1	5	..	..	1
Concrete blocks	..	..	2	1	..	..
Caskets	..	..	1	..	1	..
Sheep-raising	..	..	1	..	..	1
Wall-board	..	..	1	..	..	..
Flour mill	..	..	1	..	..	1
Engines	..	..	6	..	..	..
Carbine	..	..	1	..	..	..
Soap	..	..	1	..	..	1
Cigar-factory	..	..	1	1	..	..
Tannery	..	..	1	..	..	..
Fruit-growing	..	..	1	1	..	..
Crispettes	..	..	1	..	..	1
Sandpaper	..	..	2	1	..	1
Jam-factory	..	..	2	..	..	2
Printing	..	..	5	..	..	..
Motion-pictures	..	..	2	..	..	..
Meat-packing	..	..	1	..	..	..
Lignite	..	..	1	..	..	..
Explosives	..	..	1	..	..	..
Whaling	..	..	1	..	..	..
Powdered milk	..	..	1	..	..	..
Plumbing	..	..	1	..	..	..
Sight-seeing car	..	..	1	..	..	..
Lime-kiln	..	..	1	..	..	..
Spices and coffee	..	..	1	..	..	..
To purchase hotel	..	..	3	..	..	..
Silica	..	..	1	..	..	..
To build	..	..	3	..	..	..
Commercial piggery	..	..	1	..	..	..
Egg substitute	..	..	1	..	..	..
Monumental works	..	..	2	..	..	..
Photography	..	..	2	..	..	..
Trading-steamer	..	..	1	..	..	..
Buying of horses	..	..	1	..	..	..
Private schools	..	..	2	..	..	..
Chimney-sweeping	..	..	1	..	..	..
Ranching	..	..	1	..	..	..
Ochre	..	..	1	..	..	..
Adding-machine	..	..	1	..	..	..
Carried forward	3	34	346	52	4	41

(*f.*) CLASSIFICATION OF APPLICATIONS—*Continued.*

Industry.	Under Advisement.	Under Investigation.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Brought forward	3	34	346	52	4	41
To pay promissory notes	..	..	1	..	..	..
Candied peel	..	..	1	..	..	..
Manufacturing small advertising novelties	..	..	1	..	..	..
Umbrellas	..	..	1	..	..	..
Lath and crating	..	1	1	1	..	..
Manufacturing jewellery	..	1	..	..	..	..
Coke and by-products	..	1	..	..	..	1
Manufacturing paint	..	2	..	..	..	..
Manufacturing felt and building-paper	..	..	1	..	..	1
Manufacturing chemicals and chemical fertilizer	..	1	..	..	..	..
Development of mineral claims	..	1	..	..	..	..
Stoves and furnaces	..	1	..	..	..	..
Water-proofing oils	..	1	..	..	..	..
Household specialties	..	1	..	..	..	..
Cigar-factory	..	..	1	1	..	..
Knitted goods	1	..	..	1	..	..
Reconditioning of canned goods	1	..	..	1	..	..
Marble-works	..	1	..	..	..	..
Canned goods	..	..	1	1	..	..
Rubber soles and heels	..	..	1	1	..	..
Miscellaneous	..	..	5	..	..	..
Totals	5	45	360	58	4	43

(*g.*) FINANCIAL STATEMENT SHOWING THE DISBURSEMENTS AND RECEIPTS OF THE DEVELOPMENT FUND, 1920.

Receipts.		*Disbursements.*	
To Balance at credit of fund, January 1st, 1920	$ 19,576 93	By Disbursements on account of loans granted	$836,671 44
Advances from Provincial Treasury	815,000 00	Balance at credit of fund, December 31st, 1920	9,547 64
Refunds of loans and interest	11,642 15		
	$846,219 08		$846,219 08

(*h.*) INDUSTRIAL SUMMARY OF BRITISH COLUMBIA INDUSTRIES.

Nature of Industry.	No. of Firms engaged.	Total Wages paid.	No. of Employees.	Average Wage per Day.
Creosoting	1	$ 30,132 00	23	$5 04
Logging	567	15,336,155 00	11,250	5 25
Pulp-mills	5	3,627,223 00	2,822	4 12
Saw and shingle mills	385	14,426,922 00	12,645	4 42
Artificial limbs	1	820 00	1	6 67
Brooms and mops	7	56,563 00	113	1 93
Sash and door factories	20	201,952 00	231	3 36
Cooperages	7	79,211 00	74	4 12
Furniture-manufacturing	14	201,501 00	183	4 25
Caskets and undertaking supplies	2	51,486 00	43	4 62
Veneer and excelsior	2	93,655 00	112	3 22
Planing-mills and wood-working plants	61	1,711,496 00	1,902	3 46
Vehicle-manufacturing	5	46,041 00	36	5 00
Wooden boxes	13	313,526 00	355	3 40
Wooden-toy manufacturing	6	15,256 00	18	3 23
Carpentering (shop only)	8	22,683 00	16	5 46

(*h.*) INDUSTRIAL SUMMARY OF BRITISH COLUMBIA INDUSTRIES—*Continued.*

Nature of Industry.	No. of Firms engaged.	Total Wages paid.	No. of Employees.	Average Wage per Day.
Coal-mining	18	$9,700,000 00	7,147	$5 22
Sand, shale, clay, and gravel pits	5	69,237 00	63	4 24
Lime-kilns	4	66,658 00	66	3 88
Metal-mining	117	4,656,358 00	3,663	4 89
Monuments, lettering or setting	1	4,518 00	3	5 93
Quarrying	7	134,563 00	128	4 05
Stone dressing or cutting	9	59,347 00	36	6 30
Reduction of ores and smelting	5	1,407,786 00	1,081	5 01
Brick-manufacturing, tiles, etc.	11	138,236 00	106	5 00
Cement-manufacturing	1	96,000 00	150	4 00
Nut, bolt, nail, spike manufacturing	2	45,992 00	44	4 03
Can-manufacturing	3	277,722 00	335	3 19
Engine and boiler manufacturing	2	14,295 00	10	5 78
Iron and steel foundry	15	299,190 00	247	4 66
Manufacturing furnaces and stoves	8	40,545 00	46	3 42
Machine-shops	110	1,974,093 00	1,684	4 51
Iron and steel products manufacturing	8	73,512 00	57	4 93
Babbitt-metal manufacturing	2	14,653 00	32	4 16
Ornamental-iron works (shop only)	2	5,925 00	7	3 39
Rolling-mills	2	27,663 00	20	5 59
Sheet-metal works	34	148,301 00	131	4 35
Tent and awning manufacturing	7	57,229 00	72	3 07
Confectionery-manufacturing	18	347,448 00	569	2 35
Liquors and beverages manufacturing	44	375,254 00	359	4 02
Canning fruit and vegetables, also packing	45	956,761 00	858	4 29
Manufacturing compounds	7	76,228 00	104	2 81
Cigar-manufacturing	11	115,546 00	134	3 33
Drug-manufacturing	2	18,017 00	22	3 23
Flour and rice milling	9	48,441 00	47	3 98
Manufacturing food products	22	653,362 00	611	4 11
Bevelled, leaded glass, and silver-plating works	5	21,095 00	33	2 50
Jewellery-manufacturing	15	117,887 00	90	5 07
Knitting-mills	3	25,207 00	35	2 77
Leather-tanneries	2	32,814 00	23	3 54
Manufacturing leather shoes	2	81,900 00	90	3 50
Oil-refining	6	426,965 00	332	4 95
Manufacturing paint	8	95,601 00	122	3 01
Mfg. paper (tarred, pitched, or asphalted)	2	21,153 00	30*	2 75
Manufacturing rubber goods	19	59,947 00	53	4 36
Manufacturing stationery	5	73,455 00	159	1 78
Upholstering	14	82,644 00	75	4 23
Creameries	25	219,403 00	269	3 28
Ice-cream manufacturing	19	101,336 00	120	3 28
Condenseries	2	69,233 00	84	3 17
Cheese-factories	3	11,940 00	14	3 28
Explosives-manufacturing	3	341,449 00	322	4 08
Chemical manufacturing	3	50,818 00	47	4 15

* Increased in November, 1920, by approximately 74.

Report on the Markets for Iron and Steel on the Pacific Coast.

BY NICHOL THOMPSON, 847 BEATTY STREET, VANCOUVER, B.C.

At the request of individuals and syndicates interested in the development of the iron and steel industry on the Pacific Coast, the Department of Industries undertook to obtain definite information in respect to the local markets in British Columbia, Oregon, Washington, and California. To this end they engaged the services of Mr. Nichol Thompson, who has had considerable experience in collecting data in respect to the iron and steel industry. He has made a detailed survey of the iron-foundries and steel plants on the Pacific Coast, and has obtained first-hand information and opinions from the men in this line of industry. The information obtained is very valuable, in that it admits of a ready checking-up by persons interested in this industry, and is, to date, the most complete survey obtainable. While undertaking this survey Mr. Thompson interested all persons in this line of business in British Columbia as being the one logical location for the development of blast-furnaces, in that all the essential materials were to be obtained in British Columbia. His report is submitted herewith as a part of the Report of the Department of Industries.

D. B. Martyn, Esq.,
Commissioner of Industries, Victoria, B.C.

SIR,—The main object in gathering the information embodied in this report is to prove the extent of the local market on the Pacific Coast for the products of iron and steel, and especially the market for pig-iron, as the first essential in the iron and steel industry is a blast-furnace plant for the production of the various grades of pig-iron. I am, of course, aware of the fact that the success of ship-building and kindred industries on the Coast depends absolutely on being able to procure material for their various purposes manufactured on the Coast, so as to enable them to compete with Eastern and Old Country firms.

There is a market on the Pacific Coast for 2,000,000 tons per annum of iron and steel; i.e., this is the aggregate consumption of all grades, including tank, ship and boiler plate, merchant bar, tool and mining steel, structural steel, shapes and angles, and also light rails. Any one plant capable of turning out all these grades and sections of steel would require tremendous capital outlay in rolls and other equipment. If blast-furnaces were established here and supply of the various grades of pig-iron assured at reasonable price, subsidiary companies would undertake the manufacture of the different grades and sections of steel to suit the market.

There is, beyond a doubt, a local or domestic market on the Pacific Coast, from Los Angeles to British Columbia, for foundry pig-iron alone of at least 1,000 tons per day; and if produced at anywhere near the cost of steel scrap—$27 to $30 per ton—I think I can safely say there is a market for 2,000 tons per day. There are five scrap-mills in California, at San Francisco and Los Angeles, with monthly output of 27,000 tons, and one in Washington, at Seattle, with present output of 4,000 tons per month. These mills, turning out over 1,000 tons per day of merchant bar from steel scrap, would use at least 40 per cent. pig-iron if they could get it; in fact, Mr. Denman, of the Southern California, and Mr. Botchford, of the Columbia Steel Mills, informed me they would undertake, on behalf of the five California mills, to contract for 500 tons of pig-iron a day. The cast-iron foundries in Washington, Oregon, California, and British Columbia will easily consume 1,000 tons per day. Undoubtedly the time is opportune and there is every inducement for capital, properly organized and managed, to get in on the ground floor with the nucleus of this basic industry.

EXPORT MARKET.

In addition to the local market, there is an export market looming large in the future development of the Orient, Australasia, and Isles of the Pacific, and the west coast of Mexico and South America. The present export through British Columbia ports is now practically *nil*,

Nichol Thompson, Esq.

because of the fact that Canada does not manufacture nearly sufficient for domestic requirements and at present is a large importer of iron and steel. There is, however, a very different story to tell regarding the exports through the ports of Seattle, Tacoma, Portland, San Francisco, and Los Angeles; though even here it is somewhat difficult to obtain the correct data, as many of the items are not listed by weights but rather by value, or perhaps by number and value. In point of value this export trade through United States Pacific ports in 1918 amounted to approximately $100,000,000. The tonnage of pig-iron, steel billets, ingots, blooms, rails, and structural iron and steel in the same year totalled 1,000,000 tons and $68,000,000 of the total valuation of exports, the balance consisting of machinery or iron and steel. It is interesting to note in this connection that for the ten months ending April 30th, 1920, approximately $14,000,000 in steel rails was shipped to Pacific Ocean countries, and that this item represented 60 per cent. of the total United States exports in this commodity. These rails were mostly smaller and medium sizes, the percentage above 60 lb. being almost negligible.

Iron and Steel Workers consider Plant a Necessity.

Heads of the various iron- and steel-working plants of the Pacific Coast in Washington, Oregon, and California, who were interviewed, and gave information freely regarding their plants, consumption, etc., were practically agreed that the establishment of blast-furnaces and a steel plant on the Pacific Coast was a necessity. The time was opportune and the project would be warmly welcomed. They said they would gladly co-operate with owners of mills producing merchant bar from scrap in California, and offered to make a contract at once for 500 tons per day of pig-iron as soon as blast-furnaces were started on the Coast. All gave numerous instances of trouble and difficulties through congestion of orders and lack of cars for transportation and delivery. Prominent mill-owners in California told of investigations made by them with a view to establishing a blast-furnace, but coking-coal supplies in Washington were found unsatisfactory, and they would welcome the establishment of a Coast plant. Washington iron and steel workers said that in 1916 a number of them, including also the manager of the Bethlehem Steel, offered Mr. Piggott, of the Pacific Steel Company, a contract for 250,000 tons of ship-plate at the same price paid in the East, but he could not undertake the work. All agreed that an iron and steel plant on the Pacific Coast would not only be a distinct advantage, but profitable to the company undertaking it, the raw materials being assured—there was no difficulty about the market—but would also be of great aid to those now engaged in the iron- and steel-working industries of the Coast, and would stimulate many new industries and additions to present industries; and, moreover, would do much for the general upbuilding of the Pacific Coast.

Those interviewed in California who agreed that a plant was a necessity and the time opportune for its establishment included D. H. Botchford, Columbia Steel Company; Mr. Burgess, Pacific Steel Company; Mr. Booth, Judson Iron and Steel Company, San Francisco; A. C. Denman, Southern California Iron and Steel Works; Mr. Hill, Llewellyn Steel Company, Los Angeles—these firms being engaged in manufacturing steel, merchant bar, mainly from scrap; Mr. Rickard, of the *Mining and Scientific Press;* Mr. Smith, of Smith-Emery Company, Chemical and Testing Engineers, who was United States Government Commissioner for Iron and Steel during the war; J. J. Tynan, Bethlehem Shipbuilding Corporation; F. Baker, Baker Iron Works —all of California. In Washington and Oregon the same consensus of opinion was held by Mr. Monteagle, Pacific Construction and Engineering Company; Mr. Smith, Smith-Watson Engineering Company; Mr. Cullers, Northwest Steel Company; Mr. Morris, Puget Sound Iron and Steel Company; B. C. Ball and H. T. Humphrey, of Willamette Iron Works; John Hartman, Atlas Foundry; F. M. Foley, Griffen Steel Works; Mr. Wylie, Tod Dry Dock Company; George Danz, Hofius Steel Company; and others. Mr. Scott, representative of Midvale Steel Company, Pennsylvania, notwithstanding that his principals owned their mills in the East, was also of the same opinion, as were other dealers representative of Eastern mills, they stating that conditions were now such that owing to congestion of orders and difficulties of transportation a plant on the Coast was a necessity.

Earlier Efforts to establish Plant.

The question of a steel plant on the Pacific Coast is one that has been long considered by those interested in the iron- and steel-working industries of the Pacific slope and others, and

has received serious attention from many engineers and metallurgists. Attempts to establish an iron and steel industry on the Coast are not new or of recent origin. Not only has promotion been carried on, but actual metal has been produced.

The first metal-producing plant on record on the Coast was established in 1865, when the Oregon Iron Works built and operated a small plant at Oswego, near Portland, Oregon. This plant was operated for some years. Until 1882 it had an average production of about 5,000 tons of pig-iron a year. In 1893 a shipment of magnetite of 626 tons mined at the Elsie Claim, a great bluff of magnetite on the north shore of West Redonda Island, B.C.—the only ore mined so far on that island—was shipped to the Oswego plant for treatment and made good iron. The industry was abandoned many years ago owing to inability to compete with Eastern iron-works at a time of industrial depression.

The Puget Sound Iron Company, organized by San Francisco men who acquired large magnetite-deposits on Texada Island in 1873, soon afterwards erected a blast-furnace at Irondale, Wash., and between 1883 and 1907 shipments of over 60,000 tons were made by scow and mixed with bog-iron from Hamilton, Skagit County, Washington, in manufacture of charcoal pig-iron. The original owners, in addition to the Texada mines and the Irondale blast-furnace, owned the Union Iron Works, a pioneer iron-working plant of San Francisco, now together with the Risdon Iron Works incorporated in the Bethlehem Shipbuilding Corporation. The Irondale plant suspended operations some years ago.

The late Homer Swaney in 1903–4 became interested in iron-deposits on Vancouver Island and also in the Irondale furnace, and had practically completed arrangements for the necessary capital to establish an iron and steel industry on a commercial basis on the Pacific Coast when he was drowned in the wreck of the steamer "Clallam" in 1904.

Some time ago a number of those interested in the manufacture of merchant bar steel in California, chiefly from scrap, made investigations with regard to establishment of a blast-furnace on the Pacific Coast States, but it was found that the coal-deposits of the Coast States for coke-supply were unsatisfactory; the only coal which met requirements was that of Carbonado, Wash., but uncertainty of supply and cost of production made it almost prohibitive.

Mr. Boothin, principal owner of the Judson Iron and Steel Company, San Francisco, one of five mills in California producing merchant bar of small sizes from scrap, said he and associates had seriously considered the question of establishing blast-furnaces with Puget Sound interests headed by B. L. Thane. Options had then been taken on iron properties with this end in view, but nothing had been accomplished.

During 1916 a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel, offered Mr. Piggott, of the Pacific Steel Company, a contract for 250,000 tons of ship-plate at the cost being paid in the East, but he was unable to undertake the contract.

OPINION OF IRON AND STEEL WORKERS.

The consensus of opinion of owners and managers of the California iron-working plants is that the establishment of a blast-furnace and heavy-plate mill on the Pacific Coast is a necessity. D. H. Botchford, of Columbia Steel Company, San Francisco, said mill interests in San Francisco and Los Angeles had been seriously considering a blast-furnace on the Pacific Coast, and had made investigations regarding coal-deposits in Washington with view to coke-supply, but these were unsatisfactory; the only coal which met requirements was Carbonado, and uncertainty and cost of production made it almost prohibitive. Mr. Boothin, of Judson Iron and Steel Company, San Francisco, said he and associates had been considering this question with Puget Sound interests headed by Mr. Thane, which had paid a large sum for options on iron properties in which Mr. Boothin and wife and the Crockers had been interested. Nothing had come of the matter.

Mr. Rickard, of the *Mining and Scientific Press*, said the Noble Electric Smelting Plant had been started in Shasta County, Gala, but had not proven a success so far and was at present closed down. Mr. Smith, of the Smith-Emery Company, Chemical and Testing Engineers, who was Government Commissioner for Iron and Steel during the war, said there was not sufficient ore in Shasta County, where a great deal of money had been spent in experimenting with the electric furnace to justify the erection of a blast-furnace, although the quality of the ore was good.

Mr. Booth, manager of Judson Iron and Steel Company, said that if we had the coal and iron in British Columbia and could get a blast-furnace going we had the best business proposition on the Coast. Mr. Smith, of the Smith-Emery Company, San Francisco, a member of the Iron and Steel Institute of America, said he had covered the whole Pacific Coast from Mexico to British Columbia during the war, and had no hesitation in saying there was a market for output of a 400-ton blast-furnace, and if a plate-mill was added he would advise two 400-ton furnaces at least. Pig-iron, ship-plates, heavy shapes, I beams, channels, and angles were needed. At present California mills were exporting large shipments of what is known as "Bamboo steel" to China. A company, properly financed, should have no difficulty in attaining success when their plant was placed on a commercial basis. While he considered San Francisco offered great facilities, it might be more economical to locate farther north. Generally it was more economical to take the ore to the coal, and as British Columbia had the coking-coal, and also large deposits of high-grade iron ores, it seemed the logical place, as it would undoubtedly be cheaper to transport the finished product to the market rather than ship the raw material. The time was most opportune for commencement of a blast-furnace and heavy-plate mill.

Mr. Botchford, of the Columbia Steel Company, was decidedly of the opinion that a blast-furnace installation was a necessity. He considered present mills with good supply of pig-iron could take care of present local market for merchant bars and small angles and channels, and even have a small surplus for export. Whilst not sure that a plate-mill would pay from the start, he was of the opinion that a mill capable of turning out ship-plate and heavy I beams and shapes would follow installation of a blast-furnace plant. He could give the assurance, he said, that mill and foundry interests of the Pacific Coast would welcome and support such an undertaking. Mr. Booth, manager of Judson Iron and Steel Company, said, while he would not like to see a bar-mill in connection with a new plant, as local mills could probably take care of the local market, he considered there was an opening for a plate-mill for ship-plates, heavy shapes, I beams, and channels. He hoped a blast-furnace would be established with as little delay as possible, as undoubtedly a market existed for the product and the time was opportune for commencement of such a plant. Mr. Boothin, of the Judson Iron and Steel Company, concurred. He said there was a market for anywhere from 500 to 1,000 tons a day on the Coast, and he and associates would gladly assist and enter a business arrangement with any company prepared to commence at an early date. He thought part of the capital could be secured in San Francisco.

A. C. Denman, of Southern California Iron and Steel Works, Los Angeles, said a market existed in that district for the output of a 500-ton blast-furnace. His own plant would take 100 tons a day, and Mr. Hoswell, who represented the Los Angeles Foundrymen's Association, said cast-iron foundries of Loss Angeles consumed 300 tons of pig per day. He agreed that British Columbia was the most suitable location for a plant. Having all water transportation, vessels could land the finished production as pig-iron or billets cheaper and more economically than by bringing ore and coke to the market. Moreover, if a supply of hæmatite ore was required, good hæmatite existed in Southern California and could be put on board the steamer at San Pedro at about $4 per ton, providing return cargo for the boat landing the pig-iron. Mr. Denman said his firm used 1,500 tons of pig-iron a month and could use 3,000 tons if supply was available. He and Mr. Botchford, on behalf of the five steel and iron plants of California, gave the assurance that they were willing to enter a firm contract with a blast-furnace, even if established in British Columbia, to take 500 tons a day for a term of years if pig-iron could be delivered anywhere near present price of scrap steel—$30 per net ton. They further said there would be nothing to fear from a high tariff being imposed, as business interests on the Coast would not stand for it. Delays in delivery and recent increase of railway freights made an iron and steel plant on the Coast an urgent necessity.

Mr. Hill, of Llewellyn Iron Works, Los Angeles, said his firm would gladly support establishment of a blast-furnace and mill and considered Southern California could consume the output of a 500-ton blast-furnace. Scrap steel was getting scarcer all the time, and if suitable pig-iron was obtainable they would use a large percentage.

J. J. Tynan, general manager, Bethlehem Shipbuilding Corporation, which builds many steel steamers and handles a large amount of ship repairs—it has an extensive plant, with four floating and one large graving dock, also a large cast-iron foundry and machine-shop—and is now building seven large tankers, one steamer, and several torpedo-boats, said his firm, though connected with the Bethlehem and Schwab interests in the East, would now welcome not only a blast-furnace on the Pacific Coast, but would also like to see a good ship-plate mill in operation. They would certainly buy from the plant. Now they were compelled to buy wherever they could get delivery. They buy all their steel castings principally from the Columbia Steel Company. Their present consumption of pig-iron is about 150 tons per month, blooms and billets about 200 tons per month, and 50,000 tons per year of general merchant steel, including plates, shapes, angles, and channels. Though at one time Mr. Schwab and others thought a steel plant on the Coast could not compete with the East and Orient, the war had brought a complete change of conditions, and Mr. Tynan considered there was excellent opportunity for such a plant, and if by having the coal and iron in British Columbia we could manufacture cheaper than on Puget Sound or California, then British Columbia was the logical place.

F. Baker, of Baker Iron Works, Los Angeles, which principally fabricated structural steel for bridge and building purposes, and also had a large foundry and machine-shop, said his firm bought merchant bar from local mills, and all plates, shapes, angles, I beams, and channels, as well as pig-iron, from Pittsburgh, and great inconveniences and losses by delays in delivery occurred, Eastern manufacturers always getting preference. Any *bona-fide* company starting a blast-furnace and heavy-plate mill would get whole-hearted support from his firm.

Mr. Burgess, general manager, Pacific Steel Company, San Francisco, said his company, producing 1,100 tons of merchant bar per month, all made from scrap steel costing $27 to $30 per net ton, would gladly use 30 to 40 per cent. suitable pig-iron if reasonable price and delivery could be depended upon. His company would gladly see a blast-furnace plant turning out pig-iron on the Coast. It was not concerned as to location; what they wanted was supply and reasonable delivery, and any one fulfilling those conditions would have their support.

The opinion of those interested in iron- and steel-working concerns in Washington and Oregon is that the time is opportune for the establishment of blast-furnaces and a steel plant, for which well-informed men state there is an ample market.

Mr. Scott, representative of Midvale Steel Company, of Pennsylvania, said that, notwithstanding that his company owned their own mills in the East, conditions were such now that some of his principals were very much in favour of a works on the Pacific Coast. He gave many instances of trouble and difficulties arising through congestion of orders, lack of cars for transportation and delivery. His candid opinion was that there was a market on the Pacific Coast for steel products amounting to over 2,000,000 tons a year; he had one customer good for 25,000 tons a year. The products would consist of structural steel, including boiler and marine plate, merchant bars, rounds, squares, and flats; steel rails up to 60 lb., also nail-rods and fence-wire. He considered the Coast market would take 300,000 tons of light rails, 600,000 tons of plates, 600,000 tons of bars, and 500,000 tons miscellaneous. The bars would include all soft machinery or mild steel and drill-steel, plates, marine, boiler, tank sheet plates, and structural steel, miscellaneous, nail-rods, fence-wire, etc.

Mr. Monteagle, president of Pacific Construction and Engineering Company, Seattle, said his company would gladly co-operate with any *bona-fide* company in the establishment of an iron and steel plant on the Coast. Heads of the Vulcan Iron Works, Seattle, were of the opinion that the time was opportune for establishing a plant. E. S. Harbauch, sales agent of the United States Steel Products Company, who admitted that requirements of Coast States was from 750,000 to 1,000,000 tons a year of all grades, including light rails, structural steel, reinforcing steel, merchant bar, tank and ship plate, but was doubtful if the time was ripe for a Coast plant; the United States Steel Company had always so far anticipated the market, he said, instancing such places as Garry, Duluth, and the Canadian plant in Ontario, and if there was opportunity he thought the company would take advantage of it. He admitted, however, the tin-plate industry would stand investigation, there being a market for probably 200,000

tons a year; mining, drill, and tool steel might also be considered, but he doubted if it would be profitable to compete in such lines as steel rails, ship-plate, beams and shapes such as I beams, channels, and even heavy merchant bar or ingots and billets, owing to wide diversity of sections to the amount consumed. He thought, however, the time was drawing near when a works would be a necessity on the Coast.

S. C. E. Smith, manager, Smith-Watson Engineering Company, Portland, considered an iron and steel works on the Coast would be a direct and infinite benefit and hoped that a works would be started. Mr. Cullers, manager, North West Steel Company, Portland, said he was pessimistic so far as a steel-works on the Coast was concerned, as he doubted whether ore, coal, and limestone existed to warrant establishment. On being asked his opinion, if assured that the raw materials did exist, he said he would be enthusiastically in favour. He said: "If you have the iron ore, the coal and fluxes, then there is no doubt about the market." B. C. Ball, president, and H. T. Humphrey, manager, Willamette Iron Works, Portland, said the establishment of a plant which could compete with Eastern mills at reasonable cost and delivery would be a great benefit to manufacturers and stimulate other business. Mr. Morris, superintendent, Puget Sound Iron and Steel Company, Tacoma, said they were greatly handicapped by having to ship all their material from the East at a freight of $20 to $25 per ton, and were often held up for weeks in delivery, and an iron and steel works on the Coast would be not only of infinite benefit to manufacturers now in existence, but would stimulate establishment of many others. Mr. Eves, superintendent of Tod Shipbuilding Company, Tacoma, was heartily in support; he said if steel-shipbuilding was to continue on the Coast the material would have to be manufactured from our own raw material here. John Hartman, proprietor of Atlas Foundry, Tacoma, complained of the high costs and delay in getting material from the East and was strongly in favour of steel-works on the Coast. F. M. Foley, Griffen Wheel Works, said a steel-works could not be started too soon; the high freights and delay in getting material was a serious question, and his firm was compelled to refuse business on that account. He thought the time opportune for establishment of steel-works if we are satisfied as to the iron ore, coke, and limestone in quantities to justify it; the market was here and steadily increasing.

Mr. Wylie, of Tod Dry Dock Company, Seattle, said that in 1916 he with a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel, offered Mr. Piggott, of Pacific Steel Company, a contract for 250,000 tons of ship-plate at the same cost they were paying in the East, but Mr. Piggott could not make it go. Mr. Wylie thought the time opportune for a Coast steel plant. George Danz, manager, Hofius Steel Company, Seattle, considered a plant on the Coast would be a distinct advantage both to manufacturer and consumer. W. B. Hund, Eastern buyer of A. M. Castle & Co., dealers in iron and steel, said, while they were directly interested in mills in the East, owing to congestion of business and difficulty in getting delivery they bought largely from Pacific Iron and Steel Works, Seattle; although it might not appear in the interest of their company, he considered a steel-works on the Coast would fill a long-felt want.

Metal-working Plants on Pacific Coast.

There are a large number of metal-working plants on the Pacific Coast which at present, in addition to other material, consume approximately 1,000 tons of pig-iron and would use much more if it was procurable at a reasonable price.

Six plants, five in California and one in Washington, are engaged in manufacturing steel in open-hearth furnaces, producing 31,000 tons per month, about 65 per cent. merchant bar, ¼ to 4 inches, in rounds, squares, and flats, and reinforcing-bars, ¼ to 1¼ inches, and the balance angles up to 6 inches and beams and channels up to 8 inches. These mills now use about 96 per cent. scrap and 6 per cent. pig-iron, and would use 40 to 50 per cent. pig-iron if obtainable.

California has twenty-one iron-foundries, employing 2,300 men, using 30 to 50 per cent. pig-iron, the balance scrap, consuming about 4,500 to 5,000 tons of pig-iron per month. They could use at least 200 tons per day of pig-iron. The five steel-making plants are willing to enter into a contract at present for 500 tons of pig-iron a day. Other metal-working plants,

such as the Bethlehem Shipbuilding Corporation, now using 150 tons pig-iron, 200 tons of blooms and billets, and 50,000 tons of plates and shapes per annum; Baker Iron Works, of Los Angeles, engaged in fabricating structural steel for bridge and building purposes, with engineering-works, machine-shops, etc., would increase the market.

In Washington data compiled by the Seattle Chamber of Commerce shows present consumption of pig-iron would be about 75,000 to 100,000 tons a year. The only plant now manufacturing steel in open-hearth furnaces is the Pacific Steel Company, with normal output of 4,000 tons per month. This plant uses mostly scrap and a small percentage of magnetite from a deposit owned by the company on Texada Island. The engineering, forging, and manufacturing plants, car wheel and axle, and other plants and foundries and machine-shops consume a considerable amount and offer a growing market for pig-iron.

Oregon has thirty-five iron- and steel-working plants, of which thirty-three are foundries; the consumption of this State at present being estimated at 100,000 tons per year.

British Columbia has seventeen plants, ship-building yards, engineering and other works engaged in iron- and steel-working industries, in addition to a number of foundries, machine-shops, and smaller plants, now consuming 3,010 tons of pig-iron and offering a market for much more if available; 6,050 tons of scrap cast-iron; 1,190 tons of scrap steel; 163 tons of billets; 1,825 tons of merchant bar; 15,270 tons of ship, tank, and boiler plate; 8,715 tons of angles and shapes; 2,500 tons of rivets and rivet-bars; and 200 tons of structural steel a year.

BRITISH COLUMBIA.

While I have endeavoured to get as near as possible to the actual consumption of pig-iron in British Columbia, I do not think the returns given by the various foundries offer a fair criterion as to what the actual consumption would be if a blast-furnace plant was in operation in the Province and pig-iron procurable as a result at a reasonable price. The abnormal amount of cast scrap used is evidence of this. The increase in the cost of pig-iron since 1912 from, let us say, an average of $30 to over $70 compelled foundrymen to use scrap wherever possible.

The combined consumption of pig-iron and cast scrap in 1920 was approximately 9,060 tons.

According to data furnished by the Minister of Customs, Ottawa, the quantity and value of pig-iron imported into British Columbia for the fiscal year 1912 was 7,648 tons, valued $102,736; this value, of course, being the f.o.b. price, Liverpool, and not the selling-price here. If British Columbia could use practically 8,000 tons of imported pig-iron in 1912, it is reasonable to conclude that, owing to the increase in the industrial life of the Province, the requirements of pig-iron should be at least 15,000 to 20,000 tons per annum; and that bears out my own personal observation and conclusion that present consumption of pig-iron in British Columbia will approximate 50 tons per day. When it is considered that in 1910 the consumption of pig-iron was only 2,000 tons the increase is remarkable.

The total quantities of the products of iron and steel imported in British Columbia for the fiscal year ending March 31st, 1912, was 58,674 tons, the invoice value of which was $1,988,701; for the nine months ending December 31st, 1917, the value of the principal items of iron and steel entered for consumption through ports of British Columbia was: Dutiable, $3,988,159; free, $1,664,576; a total of $5,652,735. This shows a great increase in consumption of products of iron and steel during the past five or ten years, and taken in conjunction with the greater market to the south, and across the Pacific to the Orient and Australasia, forms an interesting basis for any one contemplating establishment of an iron and steel industry in British Columbia.

The following table shows present consumption by foundries and metal-working plants of British Columbia:—

Table A.—Present Consumption reported by British Columbia Plants.

Plant.	Pig-iron.	Case-iron Scrap.	Steel Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Wallace Shipbuilding & Drydock Co., Ltd., North Vancouver..	500	2,000	....	60	500	12,000	6,000	....	...
J. Coughlan & Sons, Ltd., Vancouver	....	....	....	50	....	400	....	2,400	200
Vulcan Iron Works, Vancouver.	200	500	....	....	100	1,500	50	....	...
Canadian Northwest Steel Co., Ltd., Vancouver	....	....	....	....	50	1,000	1,950	....	...
Ross & Howard Iron Works, Vancouver	400	350	50	....	125	50	150	....	...
Yarrows, Ltd., Victoria	100	150	....	50	200	250	100	....	...
Victoria Machinery Depot, Victoria	100	200	....	....	250	250	100	....	...
Heaps Engineering Co., Ltd., New Westminster	300	600	....	....	50	.....	30	....	...
Westminster Iron Works, New Westminster	....	....	....	3	100	50	75	....	...
Boundary Iron Works, Grand Forks	50	250	....	....	....	.....	....	....	...
Nelson Iron Works, Nelson ...	150	200	....	....	100	.....	50	....	...
Mainland Engineering Co., Vancouver	150	350	....	....	50	.....	....	....	...
Sumner Iron Works, Vancouver	100	200	....	....	....	.....	....	....	...
Vancouver Machinery Depot, Vancouver	....	....	....	....	50	20	10	....	...
Vancouver Engineering Works, Vancouver	500	400	300	50	200	200	200	100	...
Opsal Steel Co., Vancouver	10	....	840	....	50	.....	....	....	...
Hutchison Bros. & Co., Ltd., Victoria	150	250	....	....	....	.....	....	....	...
Miscellaneous foundries	300	600	....	....	....	.....	....	....	...
Totals	3,010	6,050	1,190	213	1,825	15,720	8,715	2,500	200

IRON- AND STEEL-WORKING INDUSTRIES OF BRITISH COLUMBIA.

Wallace Shipbuilding & Drydock Co., North Vancouver, is one of the pioneer ship-building and ship-repairing firms, Mr. Wallace having been in business for over twenty years. In 1907 an order was secured for a steel freight for English interests—a steamer of 5,000 tons—and since and particularly during the war this yard built a number of steamers, as well as carrying out considerable repair-work. At present two steamers are being built for the Dominion Government and a passenger-steamer for the Canadian Pacific Railway steamship service in British Columbia waters. The yard consumes now about 500 tons of pig-iron, 2,000 tons of scrap, 60 tons of billets, 500 tons of merchant bar, and 18,000 tons of structural steel per annum.

J. Coughlan & Sons, Vancouver, a firm established for fabricating structural steel for building purposes, took up ship-building in 1907, becoming very active during the war. Many steamers—over fifteen—up to 8,800 tons dead weight each, were built, and the firm has considerable work on hand, including two steamers for the Dominion Government. This firm has secured a contract from the Dominion Government for a large graving-dock at Vancouver, which carries a subsidy, and will then be in a position to undertake ship-repair work of any size. At present this firm, which has a large machine-shop, has no cast-foundry, iron castings being procured principally from the Wallace Foundry and heavy steel castings from Seattle and San Francisco, and light steel castings from the Opsal Steel Company or Vancouver Engineering Works. Mr. Coughlan, Sr., has been in business over thirty years in British Columbia. Present

consumption per annum is about 200 tons of structural steel, 50 tons of billets and ingots, 200 tons of ship and boiler plate, 200 tons of tank-plates, and 2,400 tons of rivets and rivet-bars.

Vulcan Iron Works, Vancouver, commenced business about fifteen years ago at New Westminster, manufacturing logging and sawmill boilers, and later started building marine boilers. Most of the boilers for steamers built at the Wallace and Coughlan yards were built by this firm, and several boilers are now in hand for those two firms. The firm also constructs all kinds of tanks and digesters for pulp and paper mills. Present consumption is about 100 tons of pig-iron, 500 tons of scrap, 100 tons of merchant bar, 1,500 tons of ship and boiler plate, and 35 tons of structural shapes per year.

Canadian Northwest Steel Co., Vancouver, was originally a branch of Northwest Steel Company, of Portland, Ore., but is now a separate concern. Principal business is fabricating of structural steel for buildings and bridges. Annual consumption is about 50 tons of merchant bar, 1,000 tons of ship and boiler plate, and 1,950 tons of structural shapes.

Ross & Howard Iron Works, Vancouver, established about 1890 by John Ross, Sr., and Jas. Howard, has since carried on business of ironfounders and general machine-shop work. Present plant consists of machine-shop and large cast-iron foundry. During the building boom a considerable business was done in fabricating structural steel. They also build land- and logging-engine boilers. Present consumption (annual) is 400 tons of pig-iron, 250 tons of cast scrap, 50 tons of steel scrap, 125 tons of merchant bar, 50 tons of ship and boiler plate, and 150 tons of structural steel.

Vancouver Engineering Works, Vancouver, was established over twenty years ago by Armstrong & Morrison principally for manufacturing steel pipe for water and hydraulic purposes. Later it was acquired by Colon F. Jackson and associates, who extended the business into engineering manufacturing. In addition to large machine and boiler shops, a cast-iron foundry and also a Bessemer cast-steel foundry is operated. It is practically the largest industry of the kind in the Province and would be in a position to extend the business very considerably if pig-iron could be purchased in the Province at a reasonable price. Present consumption per annum is about 500 tons of pig-iron, 400 tons of cast scrap, 300 tons of steel scrap, 50 tons of billets, 300 tons of merchant bar and steel, including rivet-steel, 200 tons of ship and boiler plate, and 200 tons of structural shapes.

Opsal Steel Co. was established some years ago principally for manufacturing logging tools and lumbering equipment generally. When first established castings were purchased outside, principally from Sheffield. About four or five years ago an electric furnace was installed and castings are now being made by this process for the firm's own use and for the trade, principally from scrap steel. About 10 tons of pig-iron and 840 tons of scrap is being used at present per annum.

Mainland Engineering Co., Vancouver, has been established for some years and does a very fair business in marine- and logging-engine repair-work. Present consumption per annum is about 150 tons of pig-iron.

Sumner Iron Works, Vancouver, uses about 100 tons of pig-iron and 200 tons of scrap per annum.

Vancouver Machinery Depot, Vancouver, carries a large stock of second-hand machinery and has a machine-shop in connection with the warehouse, whereby alterations and repairs are made to logging-engines and other machinery. The firm also is agent for manufacturers of logging and other machinery in Seattle and San Francisco. Its annual consumption is about 50 tons of merchant bar, 20 tons of boiler-plate, and 10 tons of structural shapes.

Heaps Engineering Co., New Westminster, carries on the business of building logging, sawmill, and other machinery. Present consumption per annum is about 300 tons of pig-iron, 600 tons of scrap, and 80 tons of merchant bar, plate, and shapes.

New Westminster Iron Works, New Westminster, has been in operation for a number of years. Principal business is repair-work, and the firm does not enter to any extent into construction of new machinery. It uses about 3 tons of billets, 100 tons of merchant bar, 50 tons of plate, and 75 tons of shapes per year.

Yarrows, Ltd., Victoria.—This firm was originally carried on by Messrs. Bullen, Limited, as engineers and ship-repairers and was bought out by Yarrows, Limited, about ten years ago. Several steamers of both wood and steel have been built, as well as transfer-barges of steel for the Canadian Pacific Railway Company. The firm has not entered to any extent in the building

of large steamers during the war, but secures a large percentage of the repair-work, using in conjunction with its marine railway the Government dry-dock at Esquimalt. Present annual consumption is about 100 tons of pig-iron, 150 tons of scrap, 50 tons of billets, 200 tons of merchant bar, 250 tons of plate, and 100 tons of shapes.

Victoria Machinery Depot, Victoria, established over twenty years, has been engaged in general engineering, such as building of logging and sawmill machinery and small marine engines and boilers. Recently a steel-shipbuilding yard was added under the name of the Harbour Marine Company, Limited, and several steel steamers were built for the Dominion Government. Consumption of pig-iron is about 100 tons; scrap, 200; merchant bar, 250; plate, 250; and shapes, 100 tons.

Hutchison Bros & Co., Ltd., Victoria, engages in general engineering construction, annual consumption being about 150 tons of pig-iron and 250 tons of scrap.

Boundary Iron Works, Grand Forks, have an iron-foundry established about the time the Granby smelter was built in Grand Forks, and supplied castings to various mines in the district as well as to the smelters.

Nelson Iron Works was established over twenty years ago by Mr. Hinton, who was later joined by Mr. Cunliffe, who at the time was running a small works at Rossland. This firm does an extensive business in repairing mining machinery and equipment, and uses about 150 tons of pig-iron, 200 tons of scrap, and 150 tons of merchant bar and general structural steel per annum.

In addition to the foundries and plants mentioned, there are a number of small machine-shops which have small cupolas in connection with the motor-boat and automobile business where they make their own castings. Consumption of these foundries would run approximately 100 tons of pig-iron and 150 to 200 tons of scrap per annum.

STATE OF WASHINGTON.

According to data compiled by the Seattle Chamber of Commerce, consumption of pig-iron alone in Washington would be from 75,000 to 100,000 tons per year. The only plant now manufacturing steel in open-hearth furnaces, mostly from scrap—a small percentage of magnetite-iron ore is used, secured from Texada Island—is the Pacific Steel Company, Seattle. There are a number of other plants designated iron and steel works, as are many foundries and machine-shops on the Coast, but this designation is misleading. They are mechanical engineering-works manufacturing engines and boilers, logging-engines, marine engines, and doing general repair-work. Some have an iron-foundry in connection with the plant and some have not.

The Pacific Steel Company, Seattle, have four 40-ton open-hearth furnaces, all installed since 1916. Their capacity equals 10,000 tons per month and during the war and ship-building boom were kept fully employed. Since the cessation of ship-building output has fallen off. Normal output will not exceed 4,000 tons per month, for which two furnaces will more than suffice. The product is merchant bar, or what is known as soft machinery steel, in rounds from ¼ to 3½ inches, also squares and flats from ¼ to 8 inches and 1½ to 8 inches. They also roll angles up to 6 inches. The plant makes its own billets from scrap, using a small percentage of magnetic-iron ore from a small deposit owned by the company on Texada Island, B.C. During the ship-building boom the shipyards produced about 50,000 tons of scrap per month, which has now ceased, and some of the mills are closed down for lack of scrap.

Other than the Pacific Steel Company, the principal iron- and steel-working plants of Washington have the following normal consumption at present:—

Plant.	Pig-iron.	Scrap.	Billets.	Merchant Bar.	Angles and Shapes.
	Tons.	Tons.	Tons.	Tons.	Tons.
Seattle Pacific Construction Co.	.....	.....	12,000	...	...
Washington Iron Works	5,000	5,000	100	...	...
Vulcan Iron Works, Tacoma	7,500	6,000	.....	...	...
Puget Sound Iron & Steel Works	1,800	1,800	.....	150	50
Atlas Foundry	500	500	.....	...	...
Griffen Wheel Co.	2,000	1,500	.....	800	...
Miscellaneous foundries	75,000	.....	.....	...	...
Totals	91,800	14,800	12,100	950	50

W. G. Oves, Industrial Bureau Secretary, Spokane Chamber of Commerce, furnished the following estimate of approximate consumption in the Inland Empire district of Washington:—

	Tons.
Light rails	500
Merchant bars	3,000
Structural steel	500
Angles, channels, and shapes	500
Tank plates and sheets	1,000
Boiler-plates	100
Tin-plate	1,000

PLANTS IN WASHINGTON.

The Pacific Construction & Engineering Co., Seattle, is a well-equipped forging plant with twenty-one heating-furnaces, oil-fired, and three hydraulic forging-presses. During the ship-building boom consumption of ingots and billets was about 25,000 tons a year; the normal consumption is placed at about 12,000 tons a year, with a steadily growing increase. This plant cost about $500,000. It is equipped with a huge travelling crane running the whole length of the shop and serving the furnaces and forging-presses. Ingots and billets from 6 to 54 inches square or diameter are handled, and one ingot handled weighed 51 tons. The work turned out is varied considerably. The machine-shop is fitted with modern high-speed lathes capable of turning and finishing the largest shafting. The forgings include stern and rudder frames for the largest steel steamers. Mr. Monteagle, president of the company, states he is anxious to co-operate with any bona-fide company in the establishment of an iron and steel plant on the Coast.

Washington Iron Works, Seattle, is a general engineering company, the principal product being logging-donkeys, small marine and stationary work. Consumption of pig-iron is from 300 to 500 tons per month, according to nature of the work and the proportion of scrap. The pig costs approximately $45 per ton f.o.b. East. This plant also consumes from 60 to 100 tons of billets per year. The consumption of scrap, cast, is about equal to that of pig-iron. Mr. Frank, manager, considers that an iron and steel plant on the Coast would greatly benefit the manufacturing concerns not only from a cheaper cost standpoint, but also from a delivery standpoint.

Vulcan Iron Works, Seattle, a manufacturing concern with an extensive foundry with melting capacity equalling 100 tons a day, consumed about 50 tons of pig-iron daily during the ship-building boom and now uses about 25 tons per day and a like amount of scrap. This plant handles a large quantity of structural steel and merchant bar. The management computes the consumption on the Pacific Coast will easily approximate 2,000,000 tons a year, and considers the time opportune for establishing iron and steel works on the Coast.

Puget Sound Iron and Steel Works, Tacoma, manufactures engines and boilers, logging-engines, marine engines, and does general repair-work. A cast-iron foundry is operated in connection with the plant. Castings for sawmills are also turned out. Consumption of pig-iron is about 150 tons per month and business is steadily increasing. A like amount of scrap is used. Merchant bar, principally round bars for shafting, is consumed to extent of about 12 tons per month and about 50 tons of I beams per year. Mr. Morris, the superintendent, said they were greatly handicapped by having to ship all their material from the East at freight cost of $20 to $25 per ton, and often were held up for weeks in delivery. He considers establishment of an iron and steel works on the Coast would not only be of infinite benefit to manufacturers now operating, but would stimulate many new establishments.

Hofius Steel Co., Seattle.—Details of consumption of iron and steel by this plant were not obtainable. George Danz, manager, said an iron and steel plant on the Coast would be of distinct advantage both to manufacturers and consumers. He considered a start should be made with manufacture of pig-iron, as it was the base of all industries and the market sure. The many different sections and sizes in structural steel and merchant bar would necessarily entail large expenditure in rolls and the carrying of considerable stock to ensure quick delivery,

as success would depend on not only being able to undersell the Eastern competitor, but to give prompt delivery; the trouble at present was more in connection with delivery than price. There was a large amount of tin-plate used on the Coast, but tin-plate was sold on a brand, and any new concern would not only have to guarantee quality, but would for a time have to put up bonds against their guarantee, which would require large capital. However, the market is not only here for tin-plate, but the tin goes through here to the East for manufacture and is shipped back in sheets, paying double freights. Therefore there is good opening for a tin-plate mill. The Coast market for structural steel, tank-plate, and merchant bar, including reinforcing, also light rails, might run to 1,500,000 tons for the three Coast States.

Atlas Foundry, Tacoma, is a purely cast-iron foundry, consuming over 500 tons of pig-iron a year and about the same amount of cast-iron scrap. The scrap is becoming hard to procure and more pig-iron will be required in future. Mr. Hartman, manager, says the high cost of material and delay in getting it from the East strongly favours a steel-works on the Coast.

Griffen Wheel Co., Tacoma, manufactures chilled cast-iron wheels and axles for railway freight-cars and electric-railway cars, also mining-car wheels and axles. Average annual consumption of pig-iron is about 2,000 tons a year. About 500 to 600 tons per year of mild-steel bars are used for mining and other car axles and about 200 tons a year for railway-car axles. This company is building an addition to its plant and will increase its consumption of both pig-iron and bars considerably. At present, in addition to the pig, about 2,000 tons a year of scrap is used. Mr. Foley, manager, thinks the time opportune for a steel-works if the iron ore, coke, and limestone supply is assured; the market is here and is steadily increasing.

The Crucible Steel Co., Seattle, supplies mining and machine shops with drill and tool steel. The manager stated that California, including the oilfields, consumed not less than 2,000 tons per year; Washington, 500 tons; Oregon, 350 tons; Alaska, 250 tons per annum. If steel-works were established on the Coast the manufacture of crucible steel, tool-steel, and tin-plate would naturally follow and be important subsidiaries.

Todd Drydock and Shipbuilding Co., Seattle.—Mr. Wylie, manager, was unable to give in detail the consumption of iron and steel. He said that in 1916 he, with a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel Company, offered Mr. Piggott, of the Pacific Steel Company, of Seattle, a contract for 250,000 tons of ship-plate at the same cost they were paying in the East, but he was unable to undertake the work. Mr. Wylie considers the time opportune for commencement of a blast-furnace and ship-plate mills on the Pacific Coast.

Representatives of Eastern Companies and Jobbers.

Mr. Scott, representative of Midvale Steel Company, of Pennsylvania, said the market on the Pacific Coast for steel products exceeds 2,000,000 tons a year; he had one customer for 25,000 tons a year. The Coast market would take 600,000 tons of plates—marine, boiler, and tank sheets and structural steel; 600,000 tons of bars, rounds, squares, and flats, and including soft machinery or mild steel and drill-steel; 300,000 tons of steel rails up to 60 lb.; and 500,000 tons of miscellaneous—nail-rods, fence-wire, etc. Notwithstanding that the company owned its own mills in the East, he said conditions were such now that some of his principals were much in favour of a works on the Pacific Coast. He gave many instances of trouble and difficulties arising through congestion of orders and lack of cars for transportation and delivery, and offered every assistance, including the address of one of his associates in Pittsburgh, who would become interested in a plant on the Coast.

A. M. Castle & Co., Seattle, jobbers and dealers in heavy hardware, iron, and steel. Mr. W. B. Hunt, the Eastern buyer, said the company's normal consumption of tank, flange, marine plate, and merchant bar is 750 tons per month. While directly interested in mills in the East, owing to congestion of business and difficulty in getting delivery, the company bought largely from the Pacific Iron and Steel Works, Seattle; he showed shipping bills for three car-loads bought from this source the previous week. Although it might not appear in the interest of their company, he considered a steel-works on the Pacific Coast to manufacture our raw material into the finished product would fill a long-felt want.

Karl S. Harbauch, sales agent, United States Steel Products Company, a branch of the United States Steel Company, who was cautious and conservative in his remarks, admitted requirements of the Coast States would aggregate 750,000 to 1,000,000 tons of all grades, including light rails, structural steel, reinforcing-steel, merchant bar, tank and ship plate, and sheet iron. He doubted if the time was ripe for works on the Coast, basing his opinion on the fact that the United States Steel Company had always so far anticipated the market and established works, instancing such places as Garry, Duluth, and the Canadian plant in Ontario. He thought, if there was an opportunity, his company would not hesitate to take advantage of it. He admitted, however, the tin-plate industry would stand investigation. There was a market on the Coast for probably 200,000 tons per year; mining, drill, and tool steel might also be considered. He doubted if it would be profitable to compete in such lines as steel rails, ship-plates, beams and shapes such as I beams, channels, and even heavy merchant bar or ingots and billets, owing to the wide diversity of sections in the amount consumed. He thought, however, the time was drawing near when a works would be a necessity on the Coast.

OREGON.

Oregon has thirty-five iron- and steel-working plants, of which thirty-three are foundries. Consumption of pig-iron in this State is equal to 100,000 tons per year.

Willamette Iron Works, Portland, has the following consumption of iron and steel: Tanks and boiler-plates, 10,000 tons; shapes, 500 tons; bars, 1,500 tons; rivets, 1,000 tons; billets, blooms, and forgings, 500 tons; boiler-tubes, 1,000 tons; sheets, 250 tons; pig-iron, 1,500 to 2,000 tons. This is the normal consumption. During the war it was much greater, and the company now has a contract for water-pipe installation which will take about 3,000 tons, but the difficulty is to get this material in reasonable time. During the war this firm turned out more marine boilers than any other firm in the United States. B. C. Ball, president, and H. T. Humphrey, manager, both were of the opinion, with the business on the Coast steadily increasing, that establishment of an iron and steel works on the Coast which could compete with Eastern mills at reasonable cost and delivery would be a great benefit to manufacturers and stimulate other business.

Smith Watson Engineering Co., Portland, consumed 1,500 tons of pig-iron last year, 2,000 tons of scrap, and consumption of mild steel runs from 200 to 300 tons a year. Business was steadily growing. S. C. E. Smith, manager, considered a Coast iron and steel plant would be of direct and infinite benefit to the manufacturer, and he hoped a works would be started. He would not hazard an estimate of aggregate consumption of all grades of iron and steel on the Coast, but admitted it must be considerably over 1,000,000 tons.

Northwest Steel Co., Portland.—This company has no foundry. Its consumption of structural steel was about 1,500 tons per month, including angles, shapes, beams, and plates, and 500 tons of rivet-bars. The company has contracts for seven steel oil-tank steamers of 12,000 tons each, and will consume 35,000 tons of plates and shapes in building these during the next sixteen months. His opinion was that they would continue to build steel vessels, and if steel for these can be made on the Coast it would undoubtedly help the industry. Freight on the material was now costing $22.50 per ton.

A. C. Callan, general broker and importer, Portland, said jobbers in Oregon handle over 20,000 tons of merchant bars a year, 1,500 to 2,000 tons. He estimates Washington will handle 30,000 to 50,000 tons of merchant bar and considerably more rails. Relaying rails were practically unobtainable now and there was a much greater demand for new rails up to 60 lb. He considered an iron and steel plant would be of great benefit to the Coast.

Mr. Crawford, Industrial Commissioner, Portland Chamber of Commerce, furnished the following list of cast-iron foundries in Oregon:—

Name of Foundry.	Location.	Capacity of Pig-iron per Day. Tons.
Peninsula Iron Works	Portland	20
Wood-Ewing Iron Works	"	3½
Independent Foundry Co.	"	30
American Marine Iron Works	"	17
Marine Iron Works	"	1
Smith-Watson Iron Works	"	30
John Wood Iron Works	"	7
Pacific Iron Works	"	10
Crawford & Dougherty	"	5
J. M. Leach Iron Works	"	4
Hesse Martin Iron Works	"	10
Beaver Foundry & Machine Works	"	1¼
Phoenix Iron Works	"	8
Liberty Foundry	"	7
Oregon Iron & Steel Works	"	25
Portland Stove Works	"	10
O.W.R. & N. Shops	"	10
Commercial Iron Works		5
Beaver State Motor Co.	Gresham	1½
Vaughn Motor Works		3
Coos Bay Iron Works	Marshfield	2
Astoria Marine Iron Works	Astoria	10
Ashland Iron Works	Ashland	15
Anerson Steel Furnace & Boiler	Salem	1
Cross Bros'. Iron Works	Eugene	1
Albany Iron Works	Albany	3½
W. F. Rogers' Foundry	Bandon	5
Scow Bay Iron and Brass Works	Astoria	4
Dallas Iron Works	Dallas	1¾
Vancouver Iron Works	Vancouver, Wash.	5
Salem Iron Works	Salem	3
Shofner Iron Works	Ranier	1½
Huffschmidt & Dougan	Bend	4
Hiner & Reed	Tillamook	1½
Willamette Iron & Steel Works	Portland	5
Northwest Steel Co.	"	.....
Total	.....	291½

Table B.—Present Consumption reported by Oregon Plants.

Plant.	Pig-iron.	Cast-iron Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Willamette Iron Works.....	1,500	1,500	500	1,500	10,250	500	1,000	.....
Northwest Bridge & Iron Co. ..	.....	.....	....	....	.....	....	6,000	18,000
Smith-Watson Engineering Co...	1,500	2,000	....	300	.....	....	....	.....
Miscellaneous foundries (35) ..	90,000	90,000	.....	....	.....	....	....	.....
Totals	93,000	93,500	500	1,700	10,250	500	7,000	18,000

In reply to a questionnaire on the demand for malleable castings in Portland, Ore., the following statement was furnished by the Chamber of Commerce:—

No. of Reply.	Lb. per Year used at Present.	Lb. which could be used if readily available per Year.	Remarks.
1.....	2,000	30,000 to 40,000	Small and medium castings used.
2.....	1,000 (approx.)	3,000 (approx.)	Castings for general use.
3.....	200,000	200,000	10 lb. and under, agricultural implements.
4.....	8,000	12,000	Mostly small; street-car truck.
5.....	15 tons	.....	About 5 lb. each in size used.
6.....	Very few	.....	Use considerable quantity of stamped hardware for trunks, etc.
7.....	None	2,400 (approx.)	Small castings for washing-machines.
8.....	3,000 to 5,000	5,000 to 6,000	Used for devices and machines for mill-saws.
9.....	10,000	15,000	Small castings used in Willamette logging-engines.
10.....	20,000	.....	Used for chairs.
11.....	.....	6,000	Mostly small for drag-saws.
12.....	60,000	80,000	Logging and general purposes.
13.....	2,000	5,000 (if right price)	Various used, large and small.
14.....	400,000	500,000	Malleable cast-pipe fittings, ⅛ to 6 inches.
15.....	.....	.....	Considerable quantity if price right; small castings for furniture used.
16.....	150,000	150,000	Used for portable drag-saws; average about 10 lb.
17.....	10,000	15,000	Used for machine-manufacturing.
18.....	6,000	6,000	Used for auto and wagon repairs.
19.....	None	1,000 to 2,000	Used for hoist and gear parts; considerably more used if price right.
20.....	10,000	60,000	Small; miscellaneous supplies.
21.....	200,000	350,000	Used for railroad-cars.
22.....	None	Several tons	Sawmill and paper-mill work.
23.....	„	500	Used for beds.
24.....	.....	.....	In need of malleable cast; can give more or less business.
25.....	None	2,000	Used for small elevator parts.
26.....	.....	.....	Used for window-weights.
27.....	.....	.....	Very small business.
28.....	25,000	25,000	Used for tanks; about 1 lb. each.
		Questionable	Quantity used depends upon contracts in hand.
30.....	.....	30,000	Use small cast; in need of malleable castings.
31.....	25,000	50,000	Use ½ to 50 lb. in size.
32.....	.....	.....	Not much use for cast, but in sympathy for such a factory.
33.....	.....	.....	In favour of local concern, but not much use for cast; use small castings.
34.....	2,000	4,000	
35.....	None	None	Use steel instead of malleable.
36.....	„	„	
37.....	„	„	Quantity would depend upon price.
38.....	„	„	Do not use malleable cast.
39.....	„	„	Business does not require any.
40.....	„	„	
41.....	„	„	
42.....	„	„	
43.....	„	„	
44.....	„	„	May use some next year.
45.....	„	„	Would do good business.

CALIFORNIA.

California steel and iron plants offer a steady market for at least 1,000 tons per day of pig-iron. In San Francisco and Los Angeles sections are five steel and iron mills operating seventeen open-hearth furnaces, with capacity from 25 to 50 tons, a total capacity of 635 tons. They produce 27,000 tons a month; 65 per cent. merchant bars, ¼ to 4 inches, in rounds, squares,

and flats, and reinforcing-bars from ¼ to 1¼ inches; 35 per cent. angles up to 6 inches, and I beams and channels up to 8 inches. These mills are:—

Company.	Furnaces.	Capacity.	Monthly Output.
		Tons.	Tons.
San Francisco—			
Pacific Coast Steel Co.	3	50	Over 10,000
Pacific Coast Steel Co.	3	40	
Columbia Steel Co.	3	25	About 6,000
Judson Iron & Steel Co.	3	30	Over 5,000
Los Angeles—			
Southern California Iron & Steel Co.	3	40	3,000
Llewellyn Steel Co.	2	40	3,000

These mills use scrap, approximately 1,500 tons a day, consuming about 94 per cent. scrap and 6 per cent. pig-iron. Scrap costs from $27 to $30 a ton f.o.b. San Francisco, and is hard to get at that. The price is $2 lower at Seattle. Managers say that they would use at least 10 to 25 per cent. more pig-iron if obtainable at reasonable cost.

The Columbia Steel Company have also a large cast-steel foundry, capacity of which is about 1,500 tons per month. They supply heavy steel castings, such as stern and rudder frames, and heavy engine castings, not only to shipyards of San Francisco and Los Angeles, but also to shipyards of Portland, Tacoma, Seattle, Victoria, and Vancouver.

There are twenty-five iron-foundries, employing 2,300, using 30 to 50 per cent. pig-iron, the balance scrap, consuming 4,500 to 5,000 tons of pig-iron monthly at present. They could use at least 200 tons of pig per day. Other plants, such as Bethlehem Shipbuilding Corporation, now using 150 tons of pig, 200 tons of blooms and billets, and 50,000 tons of plates, shapes, angles, and channels, and Baker Iron Works, of Los Angeles, engaged principally in fabricating structural steel for bridge and building purposes, also a large machine-shop and foundry, would add to the market. Steel and iron workers interviewed in San Francisco District concur that there is a present market for at least 500 tons a day in that district, and those interviewed in Los Angeles District say it offers a market for a like amount. Mr. Hoswell, manager of the Los Angeles Foundrymen's Association, said cast-iron foundries of Los Angeles consumed now 300 tons of pig-iron a day.

Pacific Coast Steel Co., San Francisco, have six open-hearth furnaces—three of 50 tons and three of 40 tons capacity. Output is over 10,000 tons per month. Mr. Burgess, manager, said thirty to 40 per cent. more pig-iron would be used if obtainable at reasonable price and delivery.

Columbia Steel Co., San Francisco, have three open-hearth furnaces of 25 tons capacity, with normal output of merchant bar, small beams, and shapes of 6,000 tons per month; also a large cast-steel foundry with capacity of 1,500 tons per month. Heavy steel castings, such as stern and rudder frames, and heavy engine castings are supplied not only to the shipyards of San Francisco and Los Angeles, but also to those of Portland, Seattle, Tacoma, Victoria, and Vancouver. Mr. Blotchford, manager, said the plant would use 10 to 25 per cent. more pig-iron if obtainable at a reasonable price.

Judson Iron & Steel Works, San Francisco, have three open-hearth furnaces of 30 tons capacity and monthly output of 5,000 tons.

Southern California Iron & Steel Works, Los Angeles, have three open-hearth furnaces of 40 tons capacity and output of 3,000 tons per month. The plant now uses about 1,500 tons of pig-iron, 2,000 tons of cast-scrap, and 25,000 tons of scrap steel per annum. A. C. Denman, manager, said the plant would use 3,000 tons of pig-iron per month if the price was on a par with scrap-steel prices.

Llewellyn Iron Works, Los Angeles, have two open-hearth furnaces of 40 tons capacity and output of 3,000 tons per month. This plant uses per annum 6,000 tons of pig-iron, 6,000 tons of cast scrap, 33,000 tons of scrap steel, 1,500 tons of merchant bar purchased in addition to the amount produced from scrap, 5,000 tons of ship and boiler plate, and 15,000 tons of structural shapes.

Bethlehem Shipbuilding Corporation, San Francisco, took over the Union Iron Works and Risdon Engineering Works, of San Francisco. This plant is a large one and built many steel steamers during the war and handled during the same time 800 repair jobs. It has four floating docks and a large graving-dock. At present seven oil-tank steamers are under construction, each of 12,000 tons, a large steamer for private owners, and several torpedo-boats. In addition to the ship-building plant, there is a large cast-iron foundry and machine-shop. Most of the steel castings are bought outside, principally from the Columbia Steel Company. Present consumption per annum is 1,800 tons of pig-iron, 2,400 tons of billets and blooms, and 50,000 tons of structural shapes.

Baker Iron Works, Los Angeles.—This firm is principally engaged in fabricating structural steel for bridge and building purposes. It has a large machine-shop and foundry. Merchant bar is bought from local mills, but all plates, shapes, angles, channels, and beams, as well as pig-iron, comes from the Carnegie Steel Works in Pittsburgh, and delays, inconvenience, and loss in delivery occur, Eastern manufacturers getting the preference. A blast-furnace and steel-plate mill on the Coast would have the hearty support of this firm. Mr. Baker estimates the consumption in Los Angeles section, which he says represents 50 per cent. of California, per month at 1,500 tons of pig-iron, 2,000 tons of cast scrap, 6,000 tons of steel scrap, 2,000 tons of ship and boiler plates, and 1,000 tons of structural shapes; the Los Angeles Chamber of Commerce concurred in this estimate.

Foundries, San Francisco and Vicinity.—Mr. Metcalf, secretary of the Metal Trades Association, of San Francisco, said the association is composed of the majority of the cast-iron foundries of San Francisco and vicinity, comprising twenty-five foundries, working on the open-shop principal as opposed to the California Metal Trades, with closed shops, which Mr. Metcalf said was now practically dead. The twenty-five foundries employ 2,300, use 30 to 50 per cent. pig-iron, the balance scrap. Present consumption of pig-iron is from 4,500 to 5,000 tons per month.

Foundries, Los Angeles and Vicinity.—Mr. Hoswell, manager of the Los Angeles Foundrymen's Association, said foundries of Los Angeles and neighbourhood could use about 300 tons of pig-iron per day.

Table C.—Present Consumption reported by California Plants.

Plant.	Pig-iron.	Cast-iron Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Llewellyn Iron Works, Los Angeles	6,000	6,000	....	1,500	5,000	15,000
Bethlehem Shipbuilding Corporation	1,800	1,000	2,400	....	.....	.....
Los Angeles Section, miscellaneous foundries	18,000	24,000	....	....	24,000	12,000
Southern California Iron Works	1,500	2,000	....	....	.....	.....
Miscellaneous foundries in San Francisco District	60,000	60,000	....	....	.....	.....
Totals	81,900	93,000	2,400	1,500	29,500	17,000

NOTE.—Southern California Iron Works would use 3,000 tons pig-iron per month if prices for same were on par with scrap-steel prices. Bethlehem Shipbuilding Corporation, ship and boiler plate and shapes, 50,000 tons.

REQUIREMENTS OF CALIFORNIA.

C. A. Day, director of Industrial Bureau, San Francisco, Chamber of Commerce, said local steel-mills consume 40,000 to 50,000 tons of raw material per month, 94 per cent. scrap, 6 per cent. pig and iron foundries using 30 to 50 per cent. pig, balance scrap, used about 4,500 to 5,000 tons of pig. Based on standard percentage and run of scrap and subject to change as increased

pig production displaced scrap, practical foundrymen submitted the following analysis for a good average grade of pig-iron which would command ready local sale:—

Silicon	3.00 to 3.25
Manganese	1.00 „ 1.25
Phosphorus, between	0.30 „ 0.80
Sulphur, under	0.05
Total carbon, not less than	3.25

Advantages of a Coast blast-furnace which would have direct bearing on sales are:—

(1.) Foundries would not have to carry extensive stocks as they now are obliged to do owing to great distance from supply.

(2.) Removal of uncertainties of transportation due to strikes, rail congestion, car shortages, etc.

(3.) Saving in transportation charges.

(4.) Assurance of steady supply adapted to special needs of local consumer.

A. G. Arnoll, manager, Industrial Department, Los Angeles Chamber of Commerce, said at present the entire Pacific Coast is dependent on the East and South for supply of pig-iron and steel, with exception of small tonnage of open-hearth steel produced from scrap at San Francisco and Los Angeles. Imports of foreign iron and steel are negligible; never likely to be of importance owing to cost of transportation. Therefore a blast-furnace and steel plant would have the whole Pacific Coast area as a market, which can only be reached by the Eastern manufacturer after paying transcontinental freight or a minimum water freight from Atlantic ports. The markets of South America are open on more than equal terms, and the great markets of Australasia, the Orient, and Siberia are available. Simply stated, pig-iron can be made on the Coast in the regular blast-furnace way at approximately two-thirds of cost of Pennsylvania pig-iron laid down in this market. Smelting of iron and manufacture of steel commercially is the most necessary of basic industries to the upbuilding of the Pacific Coast.

Mr. Arnoll said that, while it was difficult to get detailed information as to local production of ingots, billets, and merchant bars, it appears that not less than 20,000 tons of pig-iron is used per annum in this section (Los Angeles). Output of a 500-ton blast-furnace could readily be absorbed. A great tonnage of material could be secured from this section if a blast-furnace was in operation on the Coast, such as rails and other items now purchased elsewhere owing to lack of local facilities. Each month brings a greater call on local steel producers for large tonnage of high-grade machine and tool steels which have been shipped to this market in great quantities from the East. Only recently the Rich Steel Products Company, of Battle Creek, Mich., moved their large plants here, which will employ 1,500 and use large quantities of high-grade steels.

Owing to enforced use of scrap, local foundries and steel-mills have attained great efficiency in combining materials available for their operations. Steel-mills in their district consume 38,000 to 47,000 tons of scrap monthly. In war-time much difficulty prevailed in securing scrap, but the supply now fairly equals demand. Operators, however, are now limited by materials available and are discouraged from making extensions warranted by volume of local business owing to uncertainty of future increase in raw-material supply.

Markets for Iron and Steel.

Mr. Scott, representative of Midvale Steel Company, Pennsylvania, computes the market for steel products on the Pacific Coast, California to Alaska, at over 2,000,000 tons per annum; he had one customer good for 25,000 tons a year. There was market for 300,000 tons of light rails, 600,000 tons of plates, including marine, boiler, and tank sheet plates and structural steel; 600,000 tons of bars, including merchant bars, rounds, squares, and flats, and soft machinery or mild steel and drill-steel; and 500,000 tons miscellaneous, including nail-rods, fence-wire, etc. Heads of the Vulcan Iron Works, Seattle, consider consumption on the Pacific Coast from California to Seattle will easily aggregate 2,000,000 tons a year. S. C. E. Smith, manager of Smith-Watson Engineering Company, Portland, said he would not hazard an estimate of the aggregate consumption of all grades of iron and steel on the Coast, but admitted it must be considerably over 1,000,000 tons. A. C. Callan, broker and importer, Portland, Ore., said jobbers in Oregon handled over 20,000 tons a year of merchant bar and 1,500 to 2,000 tons of light rails. He estimated Washington jobbers to handle 30,000 to 50,000 tons of merchant bar and consider-

ably more rails. Mr. Outcoult, Industrial Commissioner, Tacoma Chamber of Commerce, said that in 1919 there were exported through Tacoma 105,301 long tons of iron and steel, all of which could be made here if a plant had been in operation. Mr. George Danz, manager, Hofius Steel Company, Tacoma, said consumption in the three Pacific States of structural steel, tank-plate, and merchant bar, including reinforcing and light rails, would run to 1,500,000 tons a year.

J. F. Thorne, business manager of *Pacific Ports*, published by Frank Waterhouse & Co., Tacoma, said consumption of iron and steel in the territory embraced by Washington, Oregon, California, Idaho, Montana, and Utah, just prior to the abnormal increase caused by the ship-building boom during the war, amounted to approximately 923,000 tons per annum. Then there were six blast-furnaces west of the Mississippi—six in Colorado, two in Montana, and one in Oregon—but only three were in operation, two in Colorado and one in Montana. Of course, since that time, due to shortage of steel in the production centres of the East and to the greatly increased local demand on account of ship-building, the conditions have changed materially and local production has greatly increased. However, the year 1915, which was at the beginning of the ship-building era on the Coast, will more nearly approximate normal conditions of the district. Because of erratic conditions existing it has been difficult to obtain accurate figures for a later period.

Analysis of consumption of iron and steel in the States under discussion in 1915, placed at 923,000 tons, shows the relative amounts approximately as follows:—

	Tons.
Pig-iron	100,000
Reinforcing-steel for concrete buildings	30,000
Sheets	136,000
Plates	217,000
Corrugated	15,000
Bar	175,000
Structural	250,000
Total	923,000

Of course, it is thoroughly understood that since the compilation of these figures the consumption has considerably more than trebled. But any figures we might aim to give during the recent high stages of the ship-building industry would be erratic and would not give a fair estimate of the normal demand. Normal consumption, as the Coast industries become straightened out, will be for domestic trade somewhere around 2,000,000 tons a year. This amount will increase as industrial progress becomes greater on the Coast.

Consumption of iron and steel on the Coast would be materially increased if there were an abundant local supply. Industries whose primary consumption is of iron and steel would be greatly increased if there were an abundant supply of iron and steel at hand; for instance, there would be a greater manufacture of bolts and nuts, perhaps of foundry material. The ship-building industry would be continued to a much greater extent and other manufacturing would become more highly developed by the mere presence of a local supply.

W. B. Henderson, of the Industrial Trade Department of Pacific Ports, Seattle, said exact and authentic information regarding markets for steel and steel products is difficult to secure. In ascertaining present consumption leading steelmen of Puget Sound were interviewed, but results obtained are not considered as complete. Consumption in Pacific States and that territory which may be considered as tributary is estimated as follows:—

	Tons.
Pig-iron	160,000
Reinforcing-steel	90,000
Sheets	100,000
Plates	125,000
Corrugated	25,000
Bar	150,000
Structural	510,000
Total	1,160,000

Considering these facts, Mr. Henderson said it is the opinion of steelmen that a blast-furnace having a capacity of 500 tons per day, together with the refining and rolling equipment necessary to manufacture the pig-iron into the various merchantable forms and shapes, would be a success. Markets are constantly expanding in the Western country and soon a much larger trade would be built up.

IMPORTS AND EXPORTS, BRITISH COLUMBIA.

The Commissioner of Customs, Ottawa, advises me that the value of iron and steel products entered for consumption in the Province of British Columbia during the fiscal year ending March 31st, 1920, amounts to $12,352,715, but, unfortunately, he does not give the tonnage or the details of these products.

Appended are tables showing the quantities and values of the products of iron and steel imported into British Columbia during the year 1912, the nine months ending December 31st, 1917, and the six months ending September 30th, 1919.

Quantities and Values of Iron and Steel imported into British Columbia for the Fiscal Year March 31st, 1912.

Item.	Quantity.	Value.
	Tons.	
Bar iron or steel, rolled, whether in coils, bundles, rods, or bars, comprising rounds, ovals, squares, and flats, n.o.p.	6,009	$ 203,851
Canada plates, Russia iron, terne plates and rolled sheets of iron or steel coated with zinc, spelter, or other metal, of all widths or thicknesses, n.o.p.	642	30,727
Castings, iron or steel, n.o.p.	.....	71,656
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes, or sections, drilled, punched, or in any further stage of manufacture than as rolled or cast, n.o.p.	1,693	89,696
Iron in pig	7,648	102,736
Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways, which term for the purposes of this item shall include all kinds of railways, street-railways, and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connection with the business of common carrying of goods or passengers	20,104	527,989
Rolled iron or steel angles, tees, beams, channels, girders, and other rolled shapes or sections, not punched, drilled, or further manufactured than as rolled, n.o.p.	1,640	47,938
Rolled iron or steel sheets or plates, sheaved or unsheaved, and skelp iron or steel, shared or rolled in grooves, n.o.p.	1,005	32,434
Rolled iron or steel plates, not less than 30 inches in width and not less than ¼ inch in thickness, n.o.p.	4,850	124,272
Rolled iron or steel sheets, polished or not, No. 14 gauge and thinners, n.o.p.	327	19,696
Sheets, flat, of galvanized iron or steel	385	22,094
Steel plate, universal mill or rolled edge plates of steel over 12 inches wide, imported by manufacturers of bridges or of structural work or in car-construction	9	523
Rolled iron or steel beams, channels, angles, and other rolled shapes, of iron or steel, not punched, drilled, or further manufactured than rolled, weighing not less than 35 lb. per lineal yard, not being square, flat, oval, or round shapes, and not being railway bars or rails	4,914	120,556
Boiler-plate of iron or steel, not less than 30 inches in width and not less than ¼ inch in thickness, for use exclusively in the manufacture of boilers	1,038	37,898
Iron or steel beams, sheets, plates, angles, knees, masts or parts thereof, and cable chains for wooden, iron, steel, or composite ships or vessels	757	27,438
Tin plates and sheets	7,653	530,199
Totals	58,674	$1,988,701

Statement showing the Principal Items of Iron and Steel entered for Consumption through Ports in British Columbia during the Nine Months ended December 31st, 1917.

Item.	Quantity.	Value.
Dutiable Goods.		
Bar iron and steel, n.o.p. ....cwt.	2,694	$ 9,013
Canada plate, Russia iron, etc. .... „	2,828	15,675
Castings, n.o.p.	.....	37,855
Cast-iron pipe ....cwt.	5,049	21,814
Chain	.....	39,088
Railway locomotives ....No.	11	39,609
Gas and gasolene engines .... „	629	146,404
Steam-engines .... „	22	79,466
Pipe-fittings	.....	119,044
Forgings ....lb.	61,548	6,624
Pig-iron ....tons	871	29,171
Iron ore .... „	3,385	13,542
Ore-crushers, rock-drills, etc.	.....	156,336
Portable saw and planing mills ....No.	69	8,137
Printing-presses	.....	14,844
Coal-handling machinery	.....	13,274
Paper- and pulp-mill machinery	.....	381,558
Sawmill machinery	.....	113,902
Machinery, n.o.p.	.....	945,876
Railway-spikes ....cwt.	3,736	12,871
Wire nails .... „	6,092	45,238
Power-pumps ....No.	237	57,972
Railway rails and bars ....tons	2,866	92,080
Rolled iron and steel angles, beams, etc. ....cwt.	21,507	85,169
Rolled iron and steel hoop, band, etc. .... „	3,295	27,428
Rolled iron and steel sheets .... „	2,182	15,545
Wire rods for the manufacture of wire .... „	33,496	117,089
Galvanized sheets .... „	5,134	41,188
Stoves	.....	14,196
Railway switches, frogs, and crossings	.....	14,955
Tubing	.....	91,304
Household hollow-ware	.....	16,613
Wire cloth	.....	15,237
Wire, n.o.p. ....lb.	556,830	28,826
Wire rope, twisted or stranded wire	.....	362,442
Scrap iron or steel ....cwt.	24,358	30,213
Universal mill-plates .... „	5,939	27,301
Rolled iron and steel in bars, bands, sheets, or plates, etc., over 3½c. per lb. „	25,988	172,576
Tools	.....	80,490
Other manufacturings of iron, n.o.p.	.....	448,194
Total	.....	$3,988,159
Free Goods.		
Anchors ....cwt.	1,682	$ 10,927
Boiler-plate .... „	8,385	48,052
Steel and iron for ship-building .... „	278,950	1,294,106
Mining machinery	.....	116,766
Boiler-tubes	.....	96,705
Wire ....cwt.	2,541	11,477
Printing-presses ....No.	5	54,550
Typesetting machinery	.....	29,873
Ferro-manganese ....tons	9	2,120
Total	.....	$1,664,576

Statement showing the Principal Items under the Classification of Iron and Steel entered for Consumption through Ports in British Columbia during the Six Months ended September 30th, 1919.

Item.	Quantity.	Value.
Rolled iron or steel in bars, bands, hoop, scroll, strip sheet, or plate, costing over 3½c. per lb. ....cwt.	15,798	$ 118,427
Boiler-plate, 30 inches wide and ¼ inch thick. .... „	12,741	51,703
Steel plate, etc., for structural work .... „	6,082	16,207
Tin-plate .... „	85,315	628,366
Rolled iron or steel sheets, 14 gauge and thinner .... „	6,048	26,806
Sheets, flat, of galvanized iron or steel .... „	4,386	25,526
Rolled iron or steel sheets or plates, unsheared or sheared, and skelp-iron, sheared or rolled grooves, n.o.p. ....cwt.	5,871	18,227
Rolled iron or steel plates, 30 inches wide and ¼ inch thick, n.o.p. .... „	6,072	16,912
Iron or steel beams, sheets, plates, etc., for vessels .... „	476,231	1,430,302
Rolled iron or steel beams, channels, etc., not further manufactured than rolled, weighing 35 lb. per lineal yard ....cwt.	13,284	36,865
Rolled iron or steel angles, tees, beams, channels, girders, etc., not further manufactured than rolled, n.o.p. ....cwt.	7,822	23,483
Railway tie plates .... „	7,613	15,498
Manufactured articles of iron, steel, or brass of a class not manufactured in Canada, for use in construction of ships	.....	161,205
Seamless-steel or wrought-iron boiler-tubes	.....	57,823
Pipe-fittings	.....	43,060
Wire cloth or woven wire and netting	.....	17,288
Wire rope, etc., wire cables, n.o.p.	.....	255,651
Traction-engines for farm purposes costing $1,400 and less ....No.	83	47,676
Cable-chains for vessels ....cwt.	5,393	51,016
Chains, n.o.p.	8	103,760
Locomotive parts	.....	16,583
Engines, gas and gasolene, n.o.p. ....No.	473	111,803
Engines, steam .... „	8	59,757
Ore-crushers, rock-crushers, stamp-mills, Cornish and belted rolls, rock-drills, and percussion coal-cutters	.....	35,648
Articles for mining and metallurgical operations	.....	77,001
Sawmill machines	.....	62,632
Pumps, power, and parts ....No.	231	52,265
Paper-mill machines	.....	19,703
Machinery and parts, n.o.p.	.....	660,016
Tools, hand, n.o.p.	.....	45,954
Automobiles, passenger ....No.	323	365,048
Automobiles, freight .... „	245	459,124
Automobile parts	.....	56,988
Motor-cycles and motor-vehicles, n.o.p. ....No.	135	14,077
Cars, other, n.o.p. .... „	113	118,072
Anchors ....cwt.	5,595	46,774
Nails, wire, n.o.p. .... „	2,493	13,532
Railway-spikes .... „	4,131	11,810
Nuts, rivets, and bolts, etc. .... „	1,734	11,770
Baths, bath-tubs, closets, and sinks, etc.	.....	10,668
Guns, rifles, firearms	.....	35,722
Stoves	.....	18,738

Imports to California.

Mr. Booth, manager of the Judson Iron Works, San Francisco, computes the structural and other steel for construction coming into San Francisco from the East at 3,000 tons per month. C. A. Day, director of the Industrial Bureau, San Francisco Chamber of Commerce, said the local mills roll only small structural shapes—flats, tees, angles, rounds, squares, and deformed bars for concrete reinforcement—and San Francisco depends entirely on the big steel-mills in Pittsburgh and Chicago Districts for the great tonnage of beams, columns, and plates used for structural purposes and ship-building. Requirements in 1920 for building purposes alone in the California city approximated 100,000 tons, which, if anything, was below normal.

Shipments of iron and steel to San Francisco by water were practically *nil* during the war. In 1920, to August, they totalled 11,672 tons—5,416 tons during the first six months, 2,142 tons in July, and 4,114 tons in August. Foreign shipments are principally from England and, in the pre-war period, from Germany. The best grade of pig-iron now coming from China, with freight of $6 to $10 per ton, added to the low cost of production owing to the small pay for labour and present moderate duty, is a keen competitor with Eastern pig-iron and likely to shut it out from the Californian market under the recently increased freight rates. Eastern rail shipments are principally from Alabama. The totals of the pig-iron shipments by rail are not now available. Rail shipments of steel to this market in 1918 totalled 636,000 tons. Later figures are not available.

EXPORTS THROUGH PACIFIC COAST PORTS.

Export markets are now large and probably will amount to a large export trade. In the past few years large quantities of iron and steel products have been sold to the Orient and the trade has been constantly expanding. We have been importing some pig-iron from China and the Orient to the Pacific Coast in competition with the Eastern manufacturers. This iron would still offer a little competition to a Western company, but could well be neglected. Average freight rate on iron and steel products from the Eastern producing centres to the Pacific Coast is $20 per ton. This would allow Western plant a margin of, say, $15 in extra costs to produce a ton of pig-iron. The costs to a local firm would be greater than those to Eastern companies, but after active co-operation was begun the margin would be smaller, thus leaving more money for selling costs and profit.

The exports of iron and steel through Washington Customs District during the calendar year 1919 were:—

Item.	Quantity.	Value.
Pig-iron ..... tons	10,062	$ 399,108
Scrap iron and steel ..... „	9,348	234,602
Bar iron ..... „	14,000	1,175,001
Wire rods ..... „	30,000	1,893,345
All other rods of steel ..... „	126,000	9,371,909
Billets, ingots of steel ..... „	937	122,450
Bolts, nuts, rivets ..... „	4,000	562,187
Car wheels and axles	.....	3,378,146
Castings	.....	220,109
Chains	.....	471,756
Boilers	.....	1,018,957
Locomotives, steam ..... engines	115	3,641,497
Boiler-tubes	.....	591,762
Wire nails ..... tons	14,000	1,167,724
Pipes and fittings, cast ..... „	850	94,777
Pipes and fittings, wrought ..... „	11,000	1,587,927
Railroad-spikes ..... „	2,360	182,853
Steel rails ..... „	95,708	6,478,156
Switches, frogs, etc.	.....	598,211
Sheets and plates, galvanized ..... tons	4,170	617,029
Sheets and plates, iron ..... „	9,360	1,105,183
Plates, steel ..... „	152,500	12,103,316
Sheets, steel ..... „	24,000	2,814,504
Ship and tank plates ..... „	5,100	542,077
Structural steel and iron ..... „	12,700	2,180,004
Wire, except barbed, steel ..... „	18,150	1,983,619
All other manufacturings of steel and iron	.....	2,034,316

This shows a total value of iron and steel products exported through the Washington District Customs-houses of $46,560,525. The imports of this district are negligible and may well be neglected. It will be easily seen that the port business through the Washington Customs District would be sufficient to take care of the output of a moderately sized mill on the Coast.

Referring to the export trade, Mr. Thorne, business manager of *Pacific Ports*, said total tonnage is rather difficult to obtain, as many items are listed not by weights, but rather by value, or perhaps number and value. In point of value this export trade in 1918 amounted to approximately $100,000,000. The tonnage of pig-iron, steel billets, ingots and blooms, rails and structural iron and steel amounted in this same year to something more than 1,000,000 tons. Of the valuation given above, $31,000,000 consisted of machinery of iron and steel and slightly more than $68,000,000 of other iron and steel articles, including the 1,000,000 tons just described. Following is a table showing export tonnage of principal commodities of basic iron and steel articles from Pacific Coast ports during 1918:—

	Tons.	Tons.
Pig-iron: Ferro-manganese—		
Washington		25
Pig-iron: All other—		
Washington	12,027	
San Francisco	1,476	
		13,503
Steel: Billets, ingots, and blooms of steel—		
Washington	22,926	
Southern California	20	
San Francisco	7,879	
Hawaii	517	
		31,342
Rails—		
Washington	76,903	
Southern California	420	
San Francisco	21,232	
		96,555
Structural iron and steel, including shapes, I beams, etc.—		
Washington	21,104	
Southern California	4	
San Francisco	16,228	
		37,336
Total		180,741

PROSPECTS OF EXPORT TRADE.

At present the entire Pacific Coast is dependent on the East and South for its supply of pig-iron and steel, with exception of a small tonnage of open-hearth steel produced from scrap at San Francisco and Los Angeles. Imports of foreign iron and steel are negligible; never likely to be of importance owing to cost of transportation. Therefore, as our principal market, we have the Pacific Coast area, comprising California, Oregon, and Washington, which can only be reached by the Eastern manufacturer after paying transcontinental freight or a minimum water freight from Atlantic ports. The markets of South America are open on more than equal terms, and the great markets of Australasia, the Orient, and Siberia are available.

Regarding future prospects for development of the iron and steel commodities, at present Japan, Australia, New Zealand, Dutch East Indies, and most of the other countries on the Pacific are now importing practically all their iron and steel. There have been sporadic attempts by the Australian Government to develop an iron industry, but up to this time little progress has been made. During the next decade there will undoubtedly be a tremendous demand for railroad material, particularly iron and steel, principally in China, but also in India, the Dutch East Indies, Philippines, Australia, Borneo, and the west coast of South America. It is interesting to note in this connection that for the ten months ending April, 1920, slightly more than $14,000,000 in steel rails were shipped to Pacific Coast countries, and that this item represented 60 per cent. of the total United States exports in this commodity. These rails were mostly of smaller and medium sizes, the percentage over 60 lb. being almost negligible.

Imports to the Pacific Coast States from the Pacific Coast countries are negligible for practical purposes. There is very little probability of serious competition for a Pacific Coast

plant from this source, for the reasons that, in the first place, the quality of the foreign production is not high, and, in the second place, that they are unable to compete on a cost basis owing to the high freight rates and cost of production at home.

With this extra business which would be open to a Coast plant, together with the local trade on the Coast, it is evident that no lack of market exists. In fact, the Eastern mills have been unable to supply the Western demands of late years and will have their entire capacity absorbed by the Eastern markets for a number of years yet. With operation of a steel-mill in this section naturally comes the establishment of subsidiary industries—foundries, tool-makers, machine-shops, large equipment and supply houses, and companies producing specialized articles, such as wire nails, pipes and tubes, etc. These likewise create a demand for more steel and cause an extension of the steel plant. Other industries depending on the use of machinery will also locate in the district.

THE TIN-PLATE INDUSTRY.

The tin-plate situation on the Pacific Coast is also interesting in this connection. Consumption of tin-plate on the Pacific Coast is well over 150,000 tons per year, but it is to the import and export phase of the subject I would refer to here. Importation of the ingots through San Francisco in 1917 was 376,085; in 1918, 537,794. In 1918 the United States imported 105,746,232 lb. of pig-tin from Asia and Oceania; 43 per cent., or 58,629,881 lb., was imported via Pacific Coast ports. Nearly all this pig-tin was shipped East at the then freight rate of 75 cents per 100 lb., and freight charges amounted to $439,724, or 1.40 per cent. of the total value, and much of this tin was manufactured in the East and reshipped back to Pacific Coast ports for export and domestic consumption.

In 1917 exports of tin-plate to foreign ports from San Francisco totalled 328,141 cases; in 1918, 358,655 cases; and during the first eleven months of 1919 the tin-plate exported through San Francisco totalled 14,127,213 lb. This is in addition to the large amount used on the Coast for domestic purposes, such as manufacture of cans and containers.

In 1918 558,170,371 lb. of tin-plate was exported to Asia, and 29 per cent., or 162,014,832 lb., was exported via Pacific Coast ports. The freight from Eastern tin-plate mills to the Coast, at 60 cents per 100 lb., amounted to $972,088, or 5.40 per cent. of total value of the tin-plate at the then market price. Practically 3,180 car-loads of tin and tin-plate were transported to the East for manufacturing and returned as tin-plate at expense for freight carriage of $1,411,813. This represents the tin-plate exported and does not include the amount used for domestic consumption on the Pacific Coast, which tonnage is unquestionably as large, or larger, than the export.

There is obviously great necessity for blast-furnace and steel-mill plants on the Pacific Coast. Normal demands of the district are sufficient to maintain a large plant in continued operation and the entire metal industry would expand under its influence, and business, both domestic and foreign, which naturally belongs to the Pacific Coast, would be kept there. A blast-furnace on the Pacific Coast would also provide material from which local mills, or new mills established for that purpose, could roll the steel for manufacture of the vast tonnage of tin-plates now shipped here from the East under heavy economic loss and subject to delays and uncertainties of trans-continental shipment. It is reasonable to suppose that with an established local source of raw material capital would readily be found to build and equip the necessary plants for manufacture of tin-plate and galvanized sheets and other light material for which there is a large and growing market.

As a result of the investigations I have made in British Columbia and in the several States of the Pacific Coast, I have compiled a table showing the normal consumption of British Columbia, Washington, Oregon, and California plants, and while this does not include a complete roster of all the plants, it shows that, based on the present normal consumption, there is an ample market for at least 1,000 tons a day of pig-iron, and if it can be produced for anything like the prevailing price being paid for scrap—now ranging from $27 to $32 per ton—I am convinced that there would be a market for at least 2,000 tons.

The following table shows the totals as checked by me at the various iron- and steel-working plants of the Pacific Coast of present normal consumption:—

Present Consumption of Iron and Steel by Pacific Coast Iron-working Plants.

Province or State.	Pig-iron.	Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British Columbia	3,010	7,140	163	1,825	15,270	8,715	2,500	200
Washington	91,800	14,800	12,100	950	.....	50	....	.....
Oregon	93,000	93,500	500	1,500	10,150	500	7,000	18,000
California*	81,900	93,000	2,400	1,700	29,000	27,000	....	.....
Totals	279,710	208,440	15,163	5,975	54,520	36,865	9,500	18,200

* In addition, ship, tank, and boiler plate and angles and shapes (combined), 50,000 tons.

This table will show that there is no doubt that the market exists for the products of iron and steel, and essentially for pig-iron.

As the basic plant for the establishment of an iron and steel industry is a blast-furnace, I have taken every care to show the extent of the local market for the output of such a plant producing the various grades of pig-iron. I am, of course, aware of the fact that the success of ship-building and kindred industries on the Coast depends on absolutely being able to procure material for their various purposes on the Coast, so as to enable them to compete with Eastern and Old Country firms. All those interviewed say there is a market on the Coast for 2,000,000 tons of iron and steel a year; that is, the aggregate consumption of all grades, including tank, ship, and boiler plate, merchant bar, tool and mining steel, structural steel, shapes and angles, and also light rails. Any plant capable of turning out all these grades and sections of steel would mean a tremendous outlay in capital for rolls and other equipment, but if blast-furnaces can be established here and a supply of the various grades of pig-iron assured at a reasonable price, subsidiary companies would undertake the manufacture of the different grades and sections of steel to suit the market. Therefore I have obtained the information as to the local market for foundry pig-iron, and that, I find, is ample to keep a plant fully occupied. The present-day consumption alone offers a market for 1,000 tons—the five plants manufacturing merchant bar from scrap in California are willing to at once undertake a contract for supply of 500 tons a day—and I feel sure that I can safely say that, without consideration of the great and growing export trade, there is a market now on the Coast for about 2,000 tons per day of foundry pig-iron.

I have, etc.,

N. THOMPSON,

Consulting Engineer.

Classification of British Columbia Industries.

MANUFACTURE OF BEVERAGES.

Firm.	Location.	Industry.
W. E. Running	Nanaimo	Manufacturing beverages.
Halcyon Bottling Works Co.	Halcyon	,, ,,
Fairalls, Ltd.	Williams St., Victoria	Manufacturing aerated waters.
Thorpe & Co., Ltd.	Victoria	Manufacturing beverages.
J. Henley	New Westminster	,, ,,
James Harper	Rossland	Manufacturing aerated waters.
Vancouver Botanic Beverage Co.	Vancouver	Manufacturing beverages.
Canadian Carbonate, Ltd.	Eleventh and Yew, Vancouver	Manufacturing liquid carbonic-acid gas.
Pioneer Bottle Works	Nanaimo	Manufacturing beverages.
Cross & Co.	38 Lansdowne Ave. E., Vancouver	Manufacturing soda-water, etc.

MANUFACTURE OF BRICK, LIME, ETC.

The Clayburn Co., Ltd.	Clayburn	Manufacturing bricks.
Rosebank Lime Co.	Victoria	Manufacturing lime.
Nicomen Sand & Gravel Co., Ltd.	c/o Foundation Co., Vancouver	Operation of gravel-pit.
Western Canada Lime Co., Ltd.	Westminster Trust Bldg., New Wesminster	Lime-kiln and quarry.
Coast Quarries, Ltd.	911 Metropolitan Bldg., Vancouver	Quarrying.
Deeks Gravel & Rock Co., Ltd.	712 Pacific Bldg., Vancouver	Sand, shale, and gravel.
Fairview Sand & Gravel Co., Ltd.	1527 Main St., Vancouver	Sand and gravel bankers.
J. B. Newell	5085 Fraser Ave., Vancouver	Stone-cutting.
Vancouver Granite Co., Ltd.	815 Bower Bldg., Vancouver	Operation of Quarry.
Pacific Lime Co., Ltd.	316 Pacific Bldg., Vancouver	Lime-kiln.
Patterson, Chandler & Stephen	3149 Main St., Vancouver	Stone-cutting and marble w'ks.
Port Haney Brick Co., Ltd.	Port Haney	Manufacturing brick.
Sechelt Granite Quarry, Ltd.	Winch Bldg., Vancouver	Quarrying.
Sidney Island Brick & Tile Co.	Sidney Island	Manufacturing brick (suspended operations).
John Mortimer & Son	720 Courtenay St., Victoria	Stone-cutting.
Baker Brick & Tile Co.	Douglas and Tolmie Sts., Victoria	Manufacturing brick.
Phillips Stone Works	1502 Fairfield Rd., Victoria	Stone-cutting.
Producers Rock & Gravel Co., Ltd.	Store St., Victoria	Sand and gravel pits.
Stewart Monumental Works	Victoria	Stone-cutting.
Granite Quarries, Ltd.	315 Bower Bldg., Vancouver	Quarrying.
Victoria Brick Co., Ltd.	Douglas St., Victoria	Manufacturing brick.
Canadian Marble & Granite Works, Ltd.	Nelson	Quarrying and stone-dressing.
Gabriola Shale Products, Ltd.	Moody Block, Victoria	Manufacturing brick.
Humber Brick Co.	207 Pemberton Bldg., Victoria	Brickyard.
Stewart & Willey	5332 Fraser Ave., Vancouver	Monumental works.
J. A. & C. H. McDonald	1571 Main St., Vancouver	Stone-cutting.
C. H. Colgrove	Prince George	Sand and gravel.
Ceramic Industries, Ltd.	304 London Bldg., Vancouver	Manufacturing brick.
North-west Lime Co., Ltd.	514 Sayward Bldg., Victoria	Lime-quarry.
Art Monument Co., Ltd.	602 Fifteenth Ave. E., Vancouver	Stone-cutting.
Warren, Doran & Mowatt	1345 Lyall St., Esquimalt	Quarrying (suspended operations).
Henson & Dyson	Victoria	Concrete blocks.
Terrace Brick Co.	Terrace	Manufacturing brick.
The Polychrone Cement, Brick & Tile Co., Ltd.	Granville Island, Vancouver	,,
Lakeside Clay Products, Ltd.	Vernon	,,
The Land Limes, Ltd.	Armstrong	Ground limestone for fertilizer.
Vernon Granite & Marble Co., Ltd.	Vernon	Stone dressing or cutting.
Enderby Brick Co.,	Enderby	Brick-making.

MANUFACTURE OF BROOMS AND BROOM-HANDLES.

Crown Broom Works, Ltd.	Vancouver	Manufacturing brooms.
Western Broom Works	,,	,, ,,
B.C. Wood Turners, Ltd.	,,	Manufacturing broom-handles.
Vancouver Handle Co., Ltd.	,,	,, ,,
B.C. Brush Works, Ltd.	,,	Manufacturing brooms and brushes.
B.C. Handle Co., Ltd.	,,	Manufacturing broom-handles.
Giffen & Begg	,,	,, ,,

Canneries.

Firm.	Location.	Industry.
Babington & Simpson	Prince Rupert	Canning crabs.
Clayoquot Sound Canning Co., Ltd.	Victoria	Cannery.
Sooke Harbour Fishing & Packing Co., Ltd.	„	„
Nanaimo Canners & Packers, Ltd.	Nanaimo	Cannery and fishing.
Glenrose Canning Co., Ltd.	New Westminster	Canning and fishing.
St. Mungo Canning Co., Ltd.	„	„ „
Great West Packing Co., Ltd.	Steveston	Cannery and fishing.
Anglo B.C. Packing Co., Ltd.	Vancouver	„ „
B.C. Fishing & Packing Co., Ltd.	„	„ „
Defiance Packing Co., Ltd.	„	Canning fish (suspended operations).
Cassiar Packing Co., Ltd.	„	Cannery and fishing.
M. DesBrisay Co.	„	„ „
Giffin Canneries, Ltd.	„	Cannery.
Gosse-Millerd Packing Co., Ltd.	„	Cannery and fishing.
Gulf Island Fishing & Canning Co., Ltd.	„	Canning fish.
C. L. Packing Co., Ltd.	„	„
Kildala Packing Co., Ltd.	„	„
Preston Packing Co., Ltd.	„	Cannery.
Wallace Fisheries, Ltd.	„	Cannery and fishing.
Nootka Packing Co., Ltd.	Nootka	Cannery.
Western Salmon Packing Co., Ltd.	c/o Evans, Coleman & Evans, Vancouver	Cannery and fishing.
Canadian Fish & Cold Storage Co., Ltd.	Prince Rupert	Cannery.
Quathiaski Canning Co., Ltd.	Quathiaski Cove	Cannery and fishing.
The Provincial Cannery Co., Ltd.	Fort and Wharf Sts., Victoria	Cannery.
Western Packers, Ltd.	Vancouver	Cannery and fishing.
Sidney Trading Co., Ltd.	Sidney	Cannery.
Liverpool Canning Co., Ltd.	Vancouver	„
Lockeport Canning Co., Ltd.	„	„
Sidney Canning Co., Ltd.	Sidney	„
J. H. Todd & Sons	Victoria	Cannery and fishing.
Lummi Bay Packing Co., Ltd.	Birmingham, Wash. (Two canneries on Vancouver Island).	„ „
Maritime Fisheries, Ltd.	Vancouver	„ „
Star Cannery, Ltd.	„	Cannery and fishing (suspended operations).
Sugarman & Greenberg	Foot of Alberta St., Vancouver	Cannery.
McTavish Fisheries, Ltd.	Vancouver	Cannery and fishing.
H. M. Frazer	Gore Wharf, Vancouver	Canning crabs.
Bamfield Fisheries, Ltd.	Bamfield	Cannery.
Ocean Packing Co., Ltd.	304 Credit Foncier Bldg., Vancouver	Cannery and fishing (suspended operations).

Chemicals and Explosives.

Nichols Chemical Co., Ltd.	Barnet	Manufacturing chemicals.
Giant Powder Co. of Canada, Ltd.	Nanoose Bay	Manufacturing explosives.
Canadian Explosives, Ltd.	913 Birks Bldg., Vancouver	Manufacturing explosives.
Victoria Chemical Co., Ltd.	Victoria	Manufacturing chemicals (suspended operations).
Sabulite Explosives, Ltd.	1001 Rogers Bldg., Vancouver	Manufacturing explosives.
Electro Products	c/o Marine Iron Works, Victoria	Manufacturing chemical compounds.

Manufacture of Cigars.

Pioneer Cigar Factory	1129 Haro St., Vancouver	Manufacturing cigars.
P. & R. Cigar Factory	1022 Seymour St., Vancouver	„ „
Province Cigar Co.	Victoria	„ „
Stettler Cigar Factory, Ltd.	Vancouver	„ „
F. E. Davidson	Kamloops	„ „
Phillip Gable Co.	Nanaimo	„ „
J. C. Thelim	Nelson	Manufacturing cigars (suspended operations).
B.C. Cigar Factory	New Westminster	Manufacturing cigars.
Beaver Cigar Factory	„	„ „
Solo Special Cigar Factory	„	„ „
Terminus Cigar Factory	378 Fifteenth Ave. E., Vancouver	„ „

Manufacture of Clothing, Knitting-mills, etc.

Guarantee Wholesalers	806 Granville St., Vancouver	Manufacturing clothing.
Turner, Beeton & Co., Ltd.	Victoria	„ „
G. A. Campbell	500 Beatty St., Vancouver	„ „
Victoria Hat Factory	Victoria	Manufacturing hats.

MANUFACTURE OF CLOTHING, KNITTING-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
Gault Bros., Ltd.	261 Water St., Vancouver	Manufacturing clothing.
Vanity Waist & Neckwear Co., Ltd.	136 Water St., Vancouver	" "
Paris Hat & Frame Co.	305–17 Cordova St. W., Vancouver	Manufacturing ladies' & men's hats.
Dal Real Lace Co., Ltd.	Vancouver	Manufacturing clothing, silk, and lace.
Kerr Manufacturing Co.	"	Manufacturing neckwear.
Maple Leaf Knitting Co.	135 Hastings St. W., Vancouver	Manufacturing knitted goods.
H. L. Finlayson	Vancouver	Manufacturing ladies' waists.
Cravat and Regalia Company, Ltd.	436 Howe St., Vancouver	Manufacturing neckwear.
Comfort Blouse Manufacturing Co.	367 Granville St., Vancouver	Manufacturing ladies' waists.
Hamilton-Carhartt Cotton Mills, Ltd.	500 Beatty St., Vancouver	Manufacturing clothing.
Pride of the West Knitting Mills, Ltd.	Vancouver	Manufacturing knitted goods.
Vancouver Knitting Co., Ltd.	"	Manufacturing clothing.
Universal Knitting Co., Ltd.	"	Manufacturing knitted goods.

COAL-MINING.

Telkwa Collieries, Ltd.	Telkwa	Coal-mining (suspended operations).
Coalmont Collieries, Ltd.	Coalmont	Coal-mining.
Corbin Coal & Coke Co.	Corbin	"
Crow's Nest Pass Coal Co., Ltd.	Fernie	"
Middlesboro Collieries, Ltd.	Middlesboro	Coal-mining (suspended operations).
Canadian Western Fuel Co.	Nanaimo	Coal-mining.
Vancouver-Nanaimo Coal Mining Co., Ltd.	"	"
Nanoose-Wellington Coal Co., Ltd.	Wellington	"
Princeton Coal & Land Co., Ltd.	Princeton	"
Canadian Collieries (Dunsmuir), Ltd.	Victoria	"
Pacific Coast Coal Mines, Ltd.	"	"
Fleming Coal Co., Ltd.	Merritt	"
Chu Chua Coal Mines Co.	Kamloops	"
Harvard Coal Co., Ltd.	Princeton	"
A. G. King & E. R. Foster	Nanaimo	"
The East Wellington Coal Co.	"	"
Granby Consolidated Mining & Smelting Co., Ltd.	Cassidy	"
Merritt Collieries	Merritt	Coal-mining (suspended operations).

MANUFACTURE OF CONFECTIONERY.

John P. Matthews Candy Co.	1308 Wharf St., Victoria	Manufacturing confectionery.
Mainland Confectionery Co.	1280 Homer St., Vancouver	Manufacturing candy.
H. A. Lilley	Victoria	Manufacturing confectionery.
Ormonds, Ltd.	"	Manufacturing confectionery and biscuits.
H. S. Stevenson	"	Manufacturing confectionery.
Bullen Bros.	1974 First Ave. W., Vancouver	" "
Kelly Confection Co., Ltd.	1106 Mainland St., Vancouver	" "
Wiper & Co.	Victoria	" "
R. C. Purdy	Vancouver	Manufacturing candy.
Hamsterley Farm Products	Victoria	" "
Howards, Ltd.	1927 Second Ave. W., Vancouver	" "
Royal Candy Co.	Victoria	" "
Phillips Confectionery Shop	1426 Government St., Victoria	" "
F. S. Clark	Nanaimo	" "
Ramsay Bros. & Co., Ltd.	990 Powell St., Vancouver	Manufacturing candy and biscuits.
J. P. Matthews Candy Co.	Vancouver	Manufacturing candy.
National Biscuit & Confection	"	Manufacturing biscuits.

COOPERAGES.

Joseph R. Robertson	Vancouver	Cooperage (suspended operations).
Sweeney Cooperage Co., Ltd.	Victoria	Manufacturing staves and heads.
B.C. Stave & Heading Co., Ltd.	Vancouver	Manufacturing staves.
British Columbia Barrel Co.	"	Manufacturing barrels (suspended operations).
L. J. Champion	South Vancouver	Cooperage.
Fraser River Cooperage	Foot of Fraser Ave., South Vancouver	Cooperage and manufacturing heads.

CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES.

Firm.	Location.	Industry.
P. Burns & Co.	Woodland Drive, Vancouver	Creamery.
"	Vernon	"
Comox Creamery Association	Courtenay	"
Cowichan Creamery Association	Duncan	"
Clayburn Creamery	Clayburn	"
Curlew Creamery Co.	Grand Forks	"
"	Nelson	"
Fraser Valley Milk Producers' Association	703 Rogers Bldg., Vancouver	Creameries.
Heffley Creek Creamery	Heffley Creek	Creamery.
Kamloops District Creamery Association	Kamloops	"
Kelowna Creamery Co., Ltd.	Kelowna	"
Meadowbrook Creamery Co.	199 Water St., Vancouver	"
Nanaimo Creamery Association	Nanaimo	"
Nechako Valley Co-operative Creamery Association	Vanderhoof	"
Northwestern Creamery, Ltd.	1131 Broad St., Victoria	"
Northern Okanagan Creamery Association	Armstrong	"
New Westminster Creamery Society, Ltd.	442 Front St., New Westminster	"
Revelstoke Creamery Co., Ltd.	Revelstoke	"
Royal Dairy Co.	Victoria	"
Saltspring Island Creamery Association	Ganges	"
Salmon Arm Creamery Association	Salmon Arm	"
David Spencer, Ltd.	Vancouver	"
Vancouver Creamery Co., Ltd.	15–23 Alexander, Vancouver	"
Vancouver Island Milk Producers' Association	930 North Park, Victoria	"
Vernon Creamery	Vernon	"
The Borden Milk Co., Ltd.	Sardis	Condensery.
The Pacific Milk Co., Ltd.	Ladner	"
"	Abbotsford	"
Fraser Valley Milk Producers' Association	Sardis	Cheese-factory.
Ferrara Cheese Manufacturing Co.	Chilliwack	"
Revelstoke Creamery Co., Ltd.	Revelstoke	"

CURING AND PACKING FISH.

Atlin Fisheries, Ltd.	Prince Rupert	Packing fish.
Butterfield Mackie & Co.	Vancouver	Curing fish and fishing.
Canadian Fishing Co., Ltd.	"	Packing fish.
Pacific Coast Fish & Oyster Co.	"	"
Nishihama & Tanaka	"	Curing fish and fishing.
Royal Fish Co.	"	" "
C. Teranishi	Vancouver	Curing fish.
Ritherdon Bay Packing Co., Ltd.	"	"
Watson Bros. Fishing & Packing Co., Ltd.	"	Curing fish and fishing.
Tjugimoto & Partners	"	Curing fish and fishing (suspended operations).
Yip Sang	"	Curing fish and fishing.
Charles Quong	"	" "
Royal Fish Co.	Prince Rupert	Packing fish.
Booth Fisheries Co. of Canada, Ltd.	"	"
Alfred Linford	Port Alberni	Curing fish.
Pacific Fisheries Co., Ltd.	Prince Rupert	Packing fish.
Union Fisheries & Cold Storage, Ltd.	Gore Wharf, Vancouver	Curing and packing fish (suspended operations).
Charles Anderson Fish Curing Co.	1547 Main St., Vancouver	Curing and packing fish.
Kaslio	15 Cordova St. E., Vancouver	Curing and packing fish and fishing.
Barclay Sound Fisheries, Ltd.	Vancouver	Curing fish.
Calvert Fisheries	1551 Main St., Vancouver	"

FISH OIL AND FERTILIZER.

Canada Fish Products, Ltd.	Ladner	Fish oil and fertilizer.
Consolidated Whaling Corporation, Ltd.	Victoria	Fish oil.
Tucks Inlet By-products	Victoria Drive, Vancouver	Fish-oil and poultry-food.
Consolidated Fish & By-products, Ltd.	Vancouver	Fish-oil (suspended operations).
Prince Rupert Oileries	Skidegate, Q.C. Islands	Dogfish-oil (suspended operations).
Globe Fertilizer Co.	Campbell Road, South Vancouver	Manufacturing fertilizer.
J. B. Jardine	Nanaimo	Fish oil and fertilizer.
Pioneer Fish & By-products Co., Ltd.	Deceit Bay	" "
William James Sturgeon, Sea Products Co.	Barnet	Liver-oil, fish-oil, feed, and fertilizer (suspended operations).
Pacific Guano Co., Ltd.	"	Manufacturing fertilizer.
Rendezvous Fisheries, Ltd.	Rendezvous Island	Fish oil and fertilizer.
Henshall Fish Products, Ltd.	Sooke	Fish-oil and poultry-food.

FLOUR AND RICE MILLING, ETC.

Firm.	Location.	Industry.
Easterbook Milling Co., Ltd.	Eburne	Flour and grain milling.
Gim Fook Yuen, Ltd.	Victoria	Rice-milling.
Mount Royal Milling and Manufacturing Co., Ltd.	"	"
Marten & Robertson, Ltd.	329 Railway St., Vancouver	"
Wing Sang Yuen Rice Mill Co.	Victoria	"
Brackman-Ker Milling Co.	"	Flour-milling.
Asahi Rice Mills	821 Powell St., Vancouver	Rice-milling.
Vancouver Milling & Grain Co., Ltd.	Vancouver	Flour-milling.
Soda Creek Flour Mills	Soda Creek	"

FRUIT CANNING AND EVAPORATING PLANTS, ETC.

Mrs. Geo. Pound	619 Fifteenth St. E., Vancouver	Manufacturing jams and jellies.
Chilliwack Evaporating & Packing Co., Ltd.	Chilliwack	Evaporation of vegetables (suspended operations).
Okanagan Canning Co., Ltd.	Rutland	Fruit-canning.
William Robinson	3636 Fourth Ave. W., Vancouver	Manufacturing food products.
W. B. M. Calder, Orchard City Evaporator	Kelowna	Evaporating plant.
Dominion Canners, Ltd.	332 Drake Street, Vancouver	Manufacturing food products.
Mrs. Haines, Ltd.	2645 Fourth Ave. W., Vancouver	Manufacturing jams and jellies.
B.C. Hop Co., Ltd.	Sardis	Evaporating vegetables.
Victoria Pressing & Canning Co.	648 Cormorant St., Victoria	Canning and packing fruit.
H. J. & J. A. Wattie	1749 Keefer St., Vancouver	Manufacturing marmalade.
B.C. Hop Co., Ltd.	Agassiz	Evaporator (suspended operations).
Keremeos Packing Co., Ltd.	815 Bower Bldg., Vancouver	Fruit-canning.
Alice Stanley	Alta Vista	Manufacturing jam.
White Manufacturing Co.	149 Alexander St., Vancouver	Manufacturing food products.
Hamsterley Farm Jam Co., Ltd.	Victoria	Manufacturing jam.
O.U.G. Fruit Products, Ltd.	Vernon	Cannery and evaporator.
North Kamloops Fruit Growing & Canning Association	Kamloops	Fruit-canning.
MacDonald Jam Co.	Nelson	Manufacturing jam.
Empress Manufacturing Co., Ltd.	Vancouver	Manufacturing jams, jellies, and spices.
W. A. Jameson Coffee Co.	Victoria	Manufacturing coffee and spices.
Western Pickling Works, Ltd.	"	Manufacturing pickles.
Harvey Coffee & Spice Mills, Ltd.	"	Manufacturing coffee and spices.
Vancouver Pickle Co., Ltd.	Vancouver	Manufacturing pickles.
Broder Canning Co., Ltd.	New Westminster	Fruit-canning.

MANUFACTURE OF FURNITURE.

Hardwood Chair Co.	Vancouver	Furniture.
The Restmore Manufacturing Co.	"	"
"	Victoria	"
Province Furniture Manufacturing Co., Ltd.	Vancouver	"
Western Toy & Furniture Manufacturing Co., Ltd.	"	"
Dowling Manufacturing Co.	"	"
D. C. Timewell	"	"
W. E. Hammond	"	"
Connaught Furniture Manufacturing Co.	"	"
Green Lumber & Furniture Co., Ltd.	Victoria	Furniture (suspended operations).
Dominion Composition Furniture & Toy Manufacturing Co., Ltd.	"	Furniture.
Steel & Dodd	New Westminster	"
K. Aalten	Vancouver	Bamboo furniture.
Thomas Bennett & Sons	"	Furniture.

MANUFACTURE OF ICE-CREAM.

Almonds, Ltd.	400 Pender St. E., Vancouver	Ice-cream.
City Dairy Co.	New Westminster	"
F. S. Clarke	Nanaimo	"
Comox Creamery Association	Courtenay	"
Curlew Creamery Co.	Grand Forks	"
"	Nelson	"
Fraser Valley Dairy	1170 Hornby St., Vancouver	"
Kelowna Creamery Co., Ltd.	Kelowna	"

MANUFACTURE OF ICE-CREAM—*Continued.*

Firm.	Location.	Industry.
J. E. McKenzie	Nanaimo	Ice-cream.
Westminster Ice & Creamery Co.	New Westminster	,,
Northern Okanagan Creamery Association	Armstrong	,,
Royal Dairy	Victoria	,,
,,	1001 Pender St., Vancouver	,,
David Spencer, Ltd.	Vancouver	,,
W. S. Terry	Fort St., Victoria	,,
Victoria City Dairy Co., Ltd.	1111 Fort Street, Victoria	,,
White Lunch, Ltd.	123 Hastings St. W., Vancouver	,,
Crescent Ice Cream Co.	1002 Hastings St. W., Vancouver	,,
Northwestern Creamery, Ltd.	Victoria	,,

LOGGING.

D. McConvey	North Gabriola Island	Logging.
H. A. Corns	Thurlow P.O.	,,
Slocan Valley Lumber Co.	Koch's Siding	,,
H. Imada	205 Powell St., Vancouver	,,
McDonald Murphy Co.	606 Vancouver Block, Vancouver	,,
Capilano Timber Co., Ltd.	North Vancouver	,,
Nimpkish Timber Co.	1527 Standard Bank, Vancouver	,,
Ira A. Reid	New Westminster	Logging (suspended operations).
S. McKee	Langley Prairie	Logging.
Little Bros.	Texada Island	,,
Geo. Lake	Fernie	Logging (suspended operations).
Edwin Sands	c/o R. V. Winch, Vancouver	Logging.
Vanstone Logging Co.	c/o B.C. Manufacturers' Association, New Westminster	,,
J. Anger	Maillardville	Logging (suspended operations).
Ralph Simpson	Arrowhead	Logging.
Vedder River Shingle Co., Ltd.	412 Yorkshire Bldg., Vancouver	Logging (suspended operations).
Hardy & Barber	Rutland Road, North Kelowna	,, ,,
J. S. Williver	Arrow Park	,, ,,
Louis Schulz	Atlin	Logging.
Dickey & Herd	Thurston Harbour, Q.C.I.	Logging (suspended operations).
Adolph Lumber Co.	Baqus Lake	Logging.
J. M. Watkins	498 Fifth Ave., Vancouver	,,
Floyd Bros.	Greenwood	Cutting ties (suspended operations).
Benton Lumber & Pole Co.	Benton Siding	Logging.
S. C. Mitchell Co.	Brideville	,,
M. Dumond	,,	,,
Russell Logging Co.	829 Standard Bank, Vancouver	,,
Dahl & Falk, Ltd.	203 Carrall St., Vancouver	,,
J. W. Milligan	Sayward Bldg., Victoria	,,
Y. Yakatsui	126 Cordova St. E., Vancouver	,,
Wm. Graham	Mackensen P.O.	Logging (suspended operations).
G. O. Guise & Weed	Midway	Logging.
J. A. Birtois	Cascade	,,
Judd Moore	Frederick Arm	,,
Adams River Lumber Co., Ltd.	Chase	,,
Victoria Lumber & Manufacturing Co., Ltd.	Vancouver	,,
R. H. Williams Cedar Co.	Chemainus	Cutting poles.
Dempsey, Ltd.	610 Pacific Bldg., Vancouver	Logging.
Orion Bowman	Sardis	,,
Eugene Patterson	Popcum	,,
G.L. Logging Co., Ltd.	1211 Dominion Bldg., Vancouver	,,
Nitinat Logging Co.	1003 Langley St., Victoria	,,
John K. Urquhart	Courtenay	,,
Beaver Creek Lumber Co.	Jervis Inlet	Logging (suspended operations).
Eastern Lumber Co.	Ladysmith	Logging.
Gordon Development Co.	606 Vancouver Block, Vancouver	,,
J. Manson	Cortes Island	,,
Hoard & Flaherty Logging Co.	Bainbridge	,,
Eagle Timber Co.	707 Northwest Bldg., Vancouver	,,
Cranbrook Sash & Door Co.	Cranbrook	,,
Red Mountain Lumber Co.	Penny	,,
F. S. Uyohara	Bishop's Landing	,,
Port Moody Lumber Co.	Strawberry Hill P.O.	,,
J. T. Knapps	Langley Prairie	Logging (suspended operations).
Andrew Piercy	Courtenay	,, ,,
Joseph Rush	Gibson's Landing	Logging.
Graham & McFarland	Denman Island	Logging (suspended operations).

LOGGING—*Continued.*

Firm.	Location.	Industry.
J. E. Bateman	Giscome	Logging.
Mc & Mc Logging Co.	612 Dominion Bldg., Vancouver	,,
Upper Fraser Lumber Co., Ltd.	Dome Creek	,,
Hillcrest Lumber Co., Ltd.	Duncan	,,
Royston Lumber Co.	Cumberland	,,
Salmon Valley Lumber & Pole Co.	Koch's Siding	Logging.
James H. Hearn	Salmo	,,
John S. Shea	Coghlan	Logging (suspended operations).
Frank Beban	Extension	Logging.
Rex Barker	Shoal Bay	Logging (suspended operations).
Fred Churchill	Porto Rico P.O.	Logging.
I. Andre	Fernie	,,
A. Farquharson	,,	,,
J. S. Mangan	,,	,,
T. Bossie	,,	,,
R. Fujii	442 Hastings St. E., Vancouver	Logging (suspended operations).
Rock Creek Lumber Co.	Flagstone	,, ,,
Joseph Morton	Seechelt Inlet	,, ,,
J. H. Hayes	Fort Steele	Logging.
J. W. Vipond	Nanaimo	,,
G. Maeda	126 Cordova St. E., Vancouver	Logging (suspended operations).
Dr. J. F. Grant	Victoria	Logging.
H. M. Okihiro	134 Powell St., Vancouver	Logging (suspended operations).
J. Carib	Midway	,, ,,
Virginia Lumber Co., Ltd.	Coombes	Logging.
Dome Mountain Lumber Co., Ltd.	Dome Creek	,,
C. E. Severus	Slocan City	,,
Evans Creek Sawmill	Evans Creek	,,
Jewell Sawmill Co., Ltd.	Carthness	,,
Elk Lumber Co., Ltd.	Fernie	,,
Harry Sawyer	Revelstoke	,,
J. C. Wilson Lumber Co.	Qualicum Beach	,,
The Bendickson Logging Co.	1214 Sandard Bank, Vancouver	,,
D. A. McNaughton	Jervis Inlet	,,
Inland Timber Co.	912 Dominion Bldg., Vancouver	,,
Swift Creek Lumber Co	Swift Creek	,,
James H. Parkin	Wattsburg	,,
Gus Olson	Britannia Beach	,,
K. Dowasaka	Dominion Bldg., Vancouver	,,
T. Aoki	323 Hastings St. E., Vancouver	,,
Copper Creek Lumber Co., Ltd.	Cranbrook	,,
Kootenay Lakes Cedar Co.	Nelson	,,
C. L. Stonehouse	134 Nineteenth St. E., North Vancouver	,,
Mitchell & Hallett	Kitimat	,,
Richard Fiddick	Cedar P.O., *via* Nanaimo	,,
Jardine & Skelhourn	Sechart	Logging (suspended operations temporarily).
J. A. Westwood	1134 Twenty-fourth Ave. E., Vancouver	Logging.
Hanna & Patchell	Harrison Hot Springs	,,
T. C. Ross	Ladysmith	,,
J. M. Humphrey	Malakwa	Logging (suspended operations temporarily).
Chas. Peters	New Westminster	Logging.
T. Sasaki	336 Pender St. W., Vancouver	Logging (suspended operations temporarily).
W. C. Palmer	Lund	Ditto.
I. D. Clarkson	Fife	Logging.
Lynn Valley Lumber Co.	Lynn Creek, North Vancouver	,,
Mathias Hemingsen	Cowichan Lake	,,
A. L. Patchett	Merritt	,,
W. Phillips & Sons	Sooke	,,
J. H. Jordan	Cranbrook	Logging (suspended operations temporarily).
Orford Bay Timber & Logging Co., Ltd.	Lund	Ditto.
Frank Chartrand	Rock Creek	Logging.
O'Hara & Bjorkman	,,	,,
Bloedel Stewart & Welch	Standard Bank Bldg., Vancouver	,,
James Easthorn	North Gabriola	,,
New Ladysmith Lumber Co., Ltd.	Nanaimo	,,
H. T. Wright	,,	,,
Laviolette & McIntyre	Simoon Sound	,,
Edgewood Lumber Co.	Castlegar	,,
Lindsley Bros., Ltd.	Nelson	,,
Lakeview Logging	Pitt Lake	,,
McGougan & McDonald	510 Northwest Bldg., Vancouver	,,
Laminated Materials Co., Ltd.	New Westminster	,,
Pacific Logging Co., Ltd.	924 Vancouver Block, Vancouver	Logging (suspended operations temporarily).
Apex Lumber	810 Dominion Bldg., Vancouver	Ditto.
Michael G. Danaher	Danaher	,,

LOGGING—*Continued.*

Firm.	Location.	Industry.
Booth Logging	1205 Dominion Bldg., Vancouver	Logging.
W. F. Gibson	1222 Keefer St., Vancouver	Logging (suspended operations temporarily).
Ted Anderson	Cascade	Cutting poles.
Domingo Silrey	Ladysmith	Logging (suspended operations temporarily).
H. Hanson	Agmont	Logging.
Tahkina Timber Co., Ltd.	336 Pender St. W., Vancouver	,,
Whitman Logging Co.	631 Eleventh Ave. E., Vancouver	,,
International Timber Co., Ltd.	Rogers Bldg., Vancouver	,,
Lamb Lumber Co.	608 Bank of Nova Scotia, Vancouver.	Logging.
Carter & Roberts	Elko	Logging (suspended operations temporarily).
Northern Cedar Logging Co., Ltd.	1016 Rogers Bldg., Vancouver	Logging.
K. Taniguchi	829 Standard Bldg., Vancouver	,,
M. A. Barnes	Merritt	Logging (suspended operations temporarily).
W. S. Prescott	1462 Eleventh Ave W., Vancouver	Logging.
J. S. McGregor	Duncan	,,
T. Tracy	Camagna	,,
Comox Logging & Railway Co.	Comox	,,
Powell River Co., Ltd.	Powell River	,,
Mainland Cedar Co., Ltd.	Connaught Bridge, Vancouver	,,
Wolf & Way	Ruskin	Logging (suspended operations temporarily).
D. Bailey	Capilano P.O.	Logging.
Pacific Mills, Ltd.	Ocean Falls	,,
Vogel & Gordon	Otter Point	,,
Nanoose Lumber Co., Ltd.	Parksville	,,
P. B. Anderson	325 Pacific Bldg., Vancouver	,,
Altamont Lumber Co.	DeMuth, Kettle Valley Rly.	,,
Pacific Shingle Co., Ltd.	Coquitlam	,,
Abernethy & Lougheed	Harvey	,,
George H. Sumner	c/o Vancouver Lumber Co., Vancouver.	Logging (suspended operations temporarily).
A. Lambert	Powell River	Logging.
James A. Brown	Port Essington	,,
J. R. Morgan & Co., Ltd.	Prince Rupert	,,
H. L. McLean	Chase	,,
Frank M. Barnes	Merritt	,,
A. E. Burnett	906 Dominion Bldg., Vancouver	,,
Sam S. Orser	Nelson	,,
L. H. Roberts	Roberts Creek	Logging (suspended operations temporarily).
R. Berrie	Rossland	Logging.
J. S. Deschamps	,,	,,
Jno. Vigene & Sons	Arrowhead	,,
S. Miyasaki	Salmon	,,
Brayden & Johnston	Salmon Arm	,,
Robert Croll	Revelstoke	,,
Jno. Nixon	Chase	,,
F. A. J. Copley	Shawnigan	,,
T. J. Vanstone	New Denver	,,
R. Tooshaw	Phoenix	Logging (suspended operations temporarily).
Oscar Salstrom	Nakusp	Logging.
I. Noda	208 Hastings St. E., Vancouver	,,
Tack Logging Co.	811 Rogers Bldg., Vancouver	,,
S. J. Demaresq	c/o Mun-Kerr Logging Co., Ltd., Vancouver Block	,,
Iver & Ed. Peterson	Canoe	,,
Dempsey, Ltd.	610 Pacific Bldg., Vancouver	,,
Conrad Wigen	Wynndel	Logging and box-manufacturing.
The Baker Lumber Co., Ltd.	Waldo	Logging.
Wattsburg Lumber Co., Ltd.	Wattsburg	,,
,, ,,	South Slocan	,,
Otis-Staples Co., Ltd.	Wycliffe	,,
The Lovering Lumber Co., Ltd.	Wasa	,,
Crow's Nest Pass Lumber Co., Ltd.	Wardner	,,
Mrs. F. J. Hawkins	3008 Douglas St., Victoria	,,
George Fennell	Chu Chua	Logging (suspended operations temporarily).
National Timber Co., Ltd.	905 Credit Foncier Bldg., Vancouver	Logging.
Merrill & Ring Lumber Co., Ltd.	Duncan Bay	,,
A. Peterson	Smithers	Logging (suspended operations temporarily).
Benjamin Morgan	Nanaimo	Logging.
W. H. Day Lumber Co., Ltd.	512 Standard Bldg., Vancouver	,,
McNeil & Jennings	Smithers	,,
Undine Logging Co., Ltd.	512 Standard Bldgs., Vancouver	,,
McLean & Paterson	Powell River	Logging (suspended operations temporarily).
Davis Logging & Trading Co., Ltd.	Standard Bank Bldg., Vancouver	Logging.

LOGGING—*Continued.*

Firm.	Location.	Industry.
Chelsea C. Cornish	Nanaimo	Logging.
Kennedy & Co.	808 Third St. E., North Vancouver	,,
Brooks-Scanlon-O'Brien Co., Ltd.	1222 Standard Bldg., Vancouver	,,
Pidcock Bros.	Quathiaski Cove	,,
James Mulroney	Green Points Rapids	Logging (suspended operations temporarily).
D. & S. Vaughan	Lund	Logging.
Russell M. Evans	Beaton	Logging (suspended operations temporarily).
Northern Pacific Logging Co., Ltd.	606 Vancouver Block, Vancouver	Logging.
The James Logging Co., Ltd.	514 Bank of Nova Scotia Bldg., Vancouver	,,
H. Newcomen	Lardeau	,,
Asken & Garson	North Vancouver	,,
Pacific Lumber & Trading Co., Ltd.	Pacific Bldg., Vancouver	,,
Ushizima & Komatsu	Clowholm Falls	,,
W. Bradburn & Son	Powell River	Logging (suspended operations temporarily).
Victor Beug	Hardwick Island	Logging.
Chas. Sahlstrom	Kincaird	,,
O'Connor Logging Co., Ltd.	707 Northwest Bldg., Vancouver	,,
Akbar Logging Co.	Mayo Siding, Duncan	Logging (suspended operations temporarily).
A. C. Vickery	Langford	Logging.
A. A. Faulkener	Enderby	,,
J. H. Newton	Chase	Logging (suspended operations temporarily).
Harrison Lake Logging Co., Ltd.	Harrison Mills	Ditto.
Garlin & Co.	Alberni	Logging.
Lee Sing	Shawnigan	,,
N. K. Wade	Port Kell	,,
Oswald L. Bouhilier	Arrowhead	,,
W. T. Dougan	Cobble Hill	,,
A. A. Plummer Co., Ltd.	810 Dominion Bldg., Vancouver	,,
James Parslow	2264 Fifteenth Ave W., Vancouver	,,
R. W. Brahm	Sicamous	,,
The A. McDonald Co.	Galloway	,,
Rainbow Creek Lumber Co.	Flagstone	,,
Salmon River Saw Mills, Ltd.	Prince George	,,
Sam Wilkinson	Elko	,,
John C. Eaton	North Gabriola Island	,,
The Hanson Logging Co.	Dominion Bldg., Vancouver	,,
Hollings Bros.	Cobble Hill	,,
Nakata Kingora	433 Alexander St., Vancouver	,,
Manzer Bros. & Bain	Silverdale	,,
Aeroplane Spruce Co., Ltd.	Port Clements	,,
D. A. McLeod	Chase	,,
Kayuichi Naito	227 Main St., Vancouver	Logging (suspended operations temporarily).
Wada & Kaminishi Logging Co.	Vancouver	Logging.
Leip & Wilt	Alvin	Logging (suspended operations temporarily).
L. A. Johnson	McBride	Logging.
Valley Cedar Co.	Dunster	,,
Hargreaver Bros.	Tete Jaune Cache	,,
G. A. Hall	Dunster	,,
T. A. Wilson	,,	Logging (suspended operations temporarily).
Joseph Lepore	772 Georgia St. E., Vancouver	Logging.
C. H. B. Reeves	Roberts Creek	Logging (suspended operations temporarily).
Sumgar Johnson	Smithers	Logging.
E. L. Steeves	West Bridge	,,
Jonathan Reed	Malakwa	,,
Seaside Lumber Co., Ltd.	Hillside, Howe Sound	Logging (suspended operations temporarily).
Carthels & Sorenson	1221 Douglas St., Victoria	Logging.
Hind & Paddon	c/o W. W. Hind, Imperial Block, Vancouver	,,
J. P. Dirassar	Wilson Creek	,,
Eric Cuvetin	Merritt	,,
H. L. Birmingham	Blind Channel	Logging (suspended operations temporarily).
T. A. Mandt	Alvin	Logging.
James R. Motion	Alberni	,,
Oscar Olson	Nakusp	,,
Pine Grove Logging Co., Ltd.	Abbotsford	Logging (suspended operations temporarily).
Crane & McKean	Daisy Lake P.O.	Logging.
F. J. Bossley	Enderby	,,
Pollock & Ross Logging Co.	Seechelt	,,
W. E. DeMille	Blind Channel	,,
H. Whittaker	Seechelt	,,
R. H. Brett	Chase	Logging (suspended operations temporarily).
A. N. Barbour	Powell River	Logging.

LOGGING—*Continued.*

Firm.	Location.	Industry.
R. Fawcett & R. Burns	Arrowhead	Logging.
Phillip McBryen	Chase	,,
Sayward Logging Co.	Marpole	Logging (suspended operations temporarily).
R. S. Burden	Coquitlam	Logging.
L. Setterlund	Fife	,,
F. Timberland	,,	,,
Holland & Edwards	Squamish	Logging (suspended operations temporarily).
Edward Elder	Bitt Lake	Logging.
F. J. Downing	Britannia Beach	,,
A. L. Snow	706 Twelfth Ave. E., Vancouver.	Logging (suspended operations temporarily).
Yeatman Bros.	Quathiaski Cove	Logging.
Taira Ikeda	75 Cordova St. W., Vancouver	,,
E. O. Perkett	Mileno Cove, Homfray Channel	,,
Burrett Lumber Co.	Swift Creek	,,
Durant H. Trgena	Gibson's Landing	,,
Deep Cove Logging Co.	525 Pacific Bldg., Vancouver	,,
W. J. Gugin	Seechelt	,,
A. A. McCormick	Surge Narrows	,,
Chas. Eng	408 Pacific Bldg., Vancouver	,,
Robert Munson	Kelowna	,,
Albert Edgar Burnett	Rogers Bldg., Vancouver	,,
Messrs. Roe & Milne	Marblehead, Lardeau	,,
Otto Johnson	Malakwa	,,
F. D. Treat	Sicamous	,,
J. G. Gilbert	Edgewater	Logging (suspended operations temporarily).
H. Trussler	Arrowhead	Logging.
Chas. Roberts	Edgewater	,,
J. E. Johnson	New Westminster	,,
C. H. Lane	East Bella Bella	,,
Timberland Development Co.	Ladysmith	,,
I. C. Rady	Lardeau	,,
John Harper	Silverdale	Logging (suspended operations temporarily).
Peachland Lumber & Manufacturing Co.	Peachland	Logging.
Swanstrom & Polson	Sicamous	,,
W. H. Johnson	Whonnock	Logging (suspended operations temporarily).
Brandon & Daney	Lardeau	Ditto.
Thomas Picard	Nakusp	Logging.
W. H. Crawford	Swanson Bay	,,
R. Hand & Son	Stillwater	,,
B. F. Somerville	Malakwa	,,
August Erickson	,,	,,
Hector MacDonald	Seechelt	,,
Clevette & Gardiner	Colwood	Logging (suspended operations temporarily).
Whittaker, Elliott & McPherson	Jervis Inlet	Logging.
Rice & Hutchison	Dollarton	Logging (suspended operations).
Charles S. Copley	Cloverdale	Ditto.
Clark & Goddard	Atlin	Logging.
Murayama, A.	666 Alexander St., Vancouver	,,
N. E. Champayne	Prince George	,,
S. Leary	Nakusp	,,
The Lapan Logging Co., Ltd.	Jackson Bay	,,
United Logging Co., Ltd.	139 Water St., Vancouver	,,
Laughlin & Reid	Egmont	,,
House & Jenkins	Seechelt	,,
A. S. Williams, Ltd.	Rogers Bldg., Vancouver	,,
A. Kelch	Craigellachie	,,
Roy Denel	8 Mill Camp, Revelstoke	,,
John Mann	North Vancouver	Logging (suspended operations).
A. S. Deighton	Vananda	Logging.
Harry Fiddick	Nanaimo	,,
Walker's Camp	909 Metropolitan Bldg., Vancouver	Logging (suspended operations).
Abe Mason	Seechelt	Logging.
Berby Logging Co.	553 Front St., New Westminster	,,
James Tussee	Chase	,,
Jno. Robillard	,,	,,
Norman McLean	,,	Logging (suspended operations).
T. L. Kennedy & Co.	Fourteenth and Hendry Ave., North Vancouver	Logging.
Ethelbert Collins	Coghlan	Logging (suspended operations).
Wooldridge Bros.	Port Clements	Logging.
Chas. Blair	Lynn Creek P.O.	Logging (suspended operations).
McLeod Timber Co., Ltd.	Pacific Bldg., Vancouver	Logging.
S. Blaney	1970 McNichol Ave., Vancouver	,,

LOGGING—*Continued.*

Firm.	Location.	Industry.
Burns & Davidson	924 Hastings St. W., Vancouver	Logging.
W. L. Mackin	Chilliwack	Logging (suspended operations).
Simplex Mills Manufacturing Co.	704 Birks Bldg., Vancouver	Ditto.
Seth Klesta	Solsqua	Logging.
K. E. Veregin & N. Tlatoff	Thompson Island	Logging (suspended operations).
C. E. Garrett & Bell	607 Vancouver Block, Vancouver	Ditto.
Leonard Irovo	McLure P.O.	Logging.
Murphy & Hanson	1205 Dominion Bldg., Vancouver	Logging (suspended operations).
W. C. Wood	Athalmer	Ditto.
Queerson-Smith Logging Co.	Bishop's Landing	,,
The Mutual Co-operative Logging Co.	Booker's Lagoon, Broughton Island	Logging.
Rivers Logging	1312 Standard Bldg., Vancouver	,,
White Spruce Co., Ltd.	Fernie	,,
Frank Chappay, c/o C. F. Kealy	614 Dominion Bldg., Vancouver	,,
George Pancoua	Seechelt Inlet	Logging (suspended operations).
C. C. Thompson	Grand Forks	Ditto.
W. J. Allan	Whytecliff	,,
George Anderson	Glen Walker	,,
Etchepare & Partners	Carmi	Logging.
Little Logging Co.	1212 Douglas St., Victoria	,,
Charles Germyn	Lynn Valley	,,
Alluvia Lumber Co., Ltd.	Sullivan P.O.	Logging (suspended operations).
W. S. Bird	636 Cornwall St., Victoria	Ditto.
John Grant	419 Keith Road W., North Vancouver	Logging.
Thos. Reid	Capilano P.O.	,,
Bruhn & McIntyre	Sicamous	Logging (suspended operations).
Frederick W. Dale	Hardwick Island	Ditto.
Walters & Gidlow	Lund	Logging.
Marshall Bros.	Port Haney	,,
Tway Logging Co.	Simoon Sound	Logging (suspended operations).
McQueen Bros.	Sproat, *via* Arrowhead	Logging.
E. Deschamos	Rossland	,,
E. A. Hillman	Beaton	,,
The Bella Coola Logging Co., Ltd.	Bella Coola	,,
R. M. Hutchison	Nakusp	,,
Clark Mill Co., Ltd., c/o Wilson & Wilson	805 Dominion Bldg., Vancouver	,,
D'Ersby Dewar Co.	122 Cordova St. W., Vancouver	,,
Bernard Timber & Logging Co., Ltd.	Orford Bay	,,
E. N. Freding	Princeton	Logging (suspended operations).
Allison & Murchy	,,	Logging.
Stainey Wayt & Co.	Blacknay Point	Logging (suspended operations).
T. A. Kelly	401 Bank of Ottawa Bldg., Vancouver	Logging.
Collins & Round	Quesnel	Logging (suspended operations).
Sinclair McLean	Fort Fraser	Logging.
Gordon McArthur & Co.	1212 Standard Bldg., Vancouver	,,
Chas. McGarrigle	Northfield	,,
P. D. Garden	Moyie	,,
J. A. Mitchell	Merville	,,
Victor Enquest	Solsqua	,,
William Louie	Chase	,,
Allan Simpson	Cobble Hill	,,
Spicer & Fraser	Courtenay	Logging (suspended operations).
George Albert Coburn	Shuswap	Logging.
A. V. Armstrong	Sperling	,,
Robert Somerville	Birgade Lake	,,
A. Roberts	Kettle Valley	,,
N. Peterson	Merritt	,,
Austin Co.	Prince George	,,
MacKenzie & Siddell	Port Moody	,,
Angus & Nelson	Silverdale	Logging (suspended operations).
Swan Bros.	Saltspring Island	Ditto.
Alex. McQueen	Dollarton	,,
Clowholm Lumber Shingle Co.	722 Rogers Bldg., Vancouver	,,
E. H. Belveal	Deep Harbour	Logging.
Fred Johnson	Sardis	Logging (suspended operations).
A. Yarco	1130 Cotton Drive, Vancouver	Logging.
Fulton, Sumner & Holbrook	Egmont	,,
Helen Bay Logging Co., Ltd.	Carriden Bay	,,
James Graham	Engen	,,
I. T. Sim	Solsqua	,,
Jack Laitio	,,	,,
Alfred Cosh	Metchosin	,,

LOGGING—*Continued.*

Firm.	Location.	Industry.
Henry C. Chamberlain	c/o Pacific Lumber & Trading Co., Ltd., Vancouver	Logging.
Cargill Co. of Canada, Ltd.	505 Vancouver Block, Vancouver.	,,
R. Hanna	Bruce's Landing	,,
R. Barlow	Arrowhead	Logging (suspended operations).
S. Yoshida	c/o D. J. O'Brien, Logging Co., Ltd., Vancouver	Logging.
Con Hagan	Dumaresq Camp, Wilber Channel	,,
Frank Lamora	315 Dominion Bldg., Vancouver..	,,
Otto Sirvio	Solsqua	,,
Pringle & Watson	Kuper Island	,,
Clarence B. Dougan, c/o P. B. Anderson	325 Pacific Bldg., Vancouver ..	,,
Charter Lumber Co., Ltd.	103 Union Bank Bldg., Vancouver	Logging (suspended operations).
Elk Bay Timber Co.	811 Metropolitan Bldg., Vancouver	Logging.
Gambier Timber Co., Ltd.	Port Haney	,,
Denman Island Logging Co.	Denman Island	,,
Henry March	Cowichan Lake	,,
C. E. Johnson	Kootenay Lake Shingle Co., Ltd. Salmo	Logging (suspended operations).
J. H. Barmby	Whonnock	Ditto.
The Shamrock Logging Co.	509 Pacific Bldg., Vancouver	Logging.
Dykes & Warren	330 Selmour St., Vancouver	,,
The Sydney Logging Co., Ltd.	408 Pacific Bldg., Vancouver ...	,,
John A. Smith, trustee for creditors of the Burrard Sawmills, Ltd.	408 Pacific Bldg., Vancouver ...	,,
J. E. Jordan & Horsfall	Duncan	,,
Howard White	Lynn Creek	,,
Kawkawa Lumber Co.	Hope	,,
W. L. Barrett	Whaletown	,,
Henry G. Andrews	Mount Lehman	Logging (suspended operations).
Provincial Lumber Co.	Kennedy	Logging.
Anderson & Ducharme	Othello	,,
The Prairie Logging Co., Ltd.	512 Board of Trade Bldg., Vancouver	,,
S. P. Pond	Nelson	,,
Geo. Browse	Langley Fort	Logging (suspended operations).
The Port Lumber Co., Ltd.	Port Moody	Logging.
Mayne Timber & Trading Co., Ltd.	Sechart	,,
Elliott Lumber & Shingles Co., Ltd.	335 Princess St., Vancouver	,,
James Vincent	Capilano	,,
Fred N. Norton	Raza Island	,,
Peck Logging Co., Ltd.	503 North West Bldg., Vancouver	,,
R. Hogino	670 Thurlow St., Vancouver	,,
Ingam E. Clark	Coghlan	,,
E. Dilts	Waldo	,,
Elias Alaric	Solsqua	,,
Georgia Lake Logging Co., Ltd.	103 Carter-Cotton Bldg., Vancouver	,,
Jamieson & Israel	Buckley Bay	,,
Hall & Patterson	Grand Forks	,,
James S. Logan	Merritt	,,
Nightongale & Young	Ganges	,,
The Valley Mills, Ltd.	614 Dominion Bldg., Vancouver..	,,
J. N. & F. Baxter	613 Carter-Cotton Bldg., Vancouver	,,
Geo. Way & Co.	Swanson Bay	,,
Waland, Doig & Stronberg	,,	,,
Jarvis & Collins	,,	,,
Bert Sprinkling	Saltspring Island	,,
R. Lum	Rock Creek	,,
O'Donnell & Madge	,,	,,
W. J. Carmichael	Ladysmith	,,
Quenville & Hane	Swanson Bay	,,
Soam Ama	Newton	,,
D. J. McDonald	Kamloops	,,
Arrow Lakes Lumber Co., Ltd.	,,	,,
H. S. Rowling	1603 Fell Ave., North Vancouver.	,,
K. Terakura	335 Princess Ave., Vancouver ..	Logging (suspended operations).
Booth & Hauzon	Sayward	Logging.
Bailey Johnson Logging Co., Ltd.	833 Hastings St. W., Vancouver.	,,
A. O'Kelly	Victoria	,,
Port Renfrew Logging & Lumber Co., Ltd.	Port Renfrew	,,
John Eck & Co.	Alvin	,,
The Falls Logging Co.	Duncan	,,
Chas. H. Carter	1562 William St., Vancouver	,,
W. E. Aickin	726 Rogers Bldg., Vancouver ...	,,
Anderson & Johnson	Chase	Logging (suspended operations).
Cliffe, Guthrie & Higgins	Comox	Logging.
C. E. Myren, c/o P. B. Anderson	325 Pacific Bldg., Vancouver ...	,,
Straits Cedars, Ltd.	302 North West Bldg., Vancouver	,,
J. C. Dunwaters	Okanagan Lake	,,

LOGGING—*Continued.*

Firm.	Location.	Industry.
H. W. Barr	Wasa	Logging (suspended operations).
Palmer Owen Logging Co.	1326 Standard Bank Bldg., Vancouver	Logging.
Cherry Point Logging Co.	209 Belmont Bldg., Victoria	"
George Campbell	Dunster	"
The Killarney Loggers, Ltd.	728 Rogers Bldg., Vancouver	"
Lewis E. Jamison	McBride	"
Spongberg & Johnson	Swanson Bay	"
Herrewig & Scothorn	Sointula	"
Frank Timmis	Parkdale, Howe Sound	"
Gower & Kennedy	Lang Bay	"
G. E. Holmes	Cloverdale	"
W. McGatty	Port Moody	Logging (suspended operations).
Frank Higgins	East Bella Bella	Logging.
Maxwell & Bings	Saltspring Island	"
Thomas Spendlove	Lynn Creek	"
R. M. Denny	239 West Twenty-second St., North Vancouver	"
W. Marlow	Sooke Road, R.R. No. 2, Victoria	"
Kangahure Yamada	143 Dunlevy Ave., Vancouver	"
Trudell & Williams	Ladysmith	"
Murphy Bros.	606 Vancouver Block, Vancouver.	"
A. Redpath	Aldergrove	"
R. E. Chittick	Nakusp	"
The Campbell Logging Co., Ltd.	1404 Dominion Bldg., Vancouver.	"
Greenway Logging Co.	Greenway Sound	"
Widman Bros.	315 Dominion Bldg., Vancouver..	"
H. N. Horel	Kennedy Station on B.C.E. Rly...	"
J. W. Gordon	Squamish	"
J. Myers	1840 Sixth Ave. E., Vancouver..	"
San Juan Box Co., Ltd.	Port Renfrew	"
J. E. Haldcroft	McBride	Logging (suspended operations).
A. W. Brouse	Lasqueti Island	Logging.
Alex. Stewart	Ladysmith	Logging (suspended operations).
The West Coast Loggers, Ltd.	Foot of Smythe St., Vancouver..	Logging.
H. Sheaves & W. Reutley	Port Mann	"
Sumner & McDonald	Port Neville	Logging (suspended operations).
The Deserted Bay Logging Co., Ltd.	421 Vancouver Block, Vancouver	Logging.
Silver Creek Logging Co.	Mission City	"
Delin Singh & Namo	Seechelt	"
John Robertson	Strawberry Hill	Logging (suspended operations).
Adair & Clark	Haney	Logging.
Pye & Pye	Minstrel Island	"
S. L. Romano	772 Georgia St. E., Vancouver ..	"
Chas. H. Murphy	535 Pender St. W., Vancouver ..	Logging (suspended operations).
Martin & Lundquist	Gibson's Landing	Ditto.
D. A. Brewster & Co.	Tribune Channel, Thompson Sound	Logging.
A. C. Carlin	1421 Richardson St., Victoria	Logging (suspended operations).
Eagle Lake Logging Co.	Newlands	Logging.
S. Ellingsen	c/o Munn & Kerr Timber Co., Churchhouse	"
A. R. Crooks	Capilano	"
Phillip H. Welch	Crofton	"
The Interior Cedar Co., Ltd.	Revelstoke	"
Polson & Anderson	Malakwa	"
S. G. McNutt	Belcarra, Burrard Inlet	"
F. W. Sentell	Langley Prairie	"
H. A. H. Churchill & Mouat	Ganges	"
T. Shimoisaka	1214 Dominion Bldg., Vancouver.	"
Robert Russell	Capilano P.O.	"
Allen & Gordon	Blind Channel	"
Eliason, Eliason & Shelton	Green Point Rapids	"
Mosher Logging Co.	Chancellor Channel	"
McKinnon & Rusch	Rock Creek	"
F. Soucie	Coalmont	"
James Simmons	Cariden Bay	"
Dumaresqu & Martin	Wellbore Channel	"
Nowat Bros.	Alta Lake	"
R. Archibald	Clowholm Falls via Seechelt	"
Mitchell Cameron	Langley Prairie	"
Matilot Logging Co.	Alert Bay	"
Hogan, Bicknell, Inrig & M. Robertson..	Wadhams Cannery	"
Frumento & Heywood	Cowichan Station	"
Ed. Johnson & Co.	Solsqua	"
Barber & Gibbon	Lasqueti Island	"
Gaskins & Welch	Alert Bay	"
Dondale & Jones	Grand Forks	"

Machine-shops and Foundries.

Firm.	Location.	Industry.
Cranbrook Foundry Co.	Cranbrook	Foundry.
Victoria Brass & Iron Works	Pioneer St., Victoria	Brass and iron works.
Boundry Iron Works, Ltd.	Grand Forks	Foundry.
Golightly Bros., Ltd.	763 Powell St., Vancouver	Machine-shop.
W. J. Ellis & Co.	Kamloops	,,
A. P. Jones & Johnson	Kelowna	,,
Geo. R. Mitchell	1050 Seaton St., Vancouver	,,
Frank Osborne	Lund	,,
Cormack & Annard	Foot of Tenth St., New Westminster.	,,
Nanaimo Foundry	Nanaimo	,,
Nelson Iron Works	Nelson	Foundry and machine-shop.
New Westminster Foundry Co., Ltd.	New Westminster	Foundry.
Heaps Engineering Co., Ltd.	,,	Foundry and machine-shop.
W. R. Jaynes	726 Front St., New Westminster	Machine-shop.
Westminster Iron Works	66 Tenth St., New Westminster	,,
Schaake Co., Ltd.	Granville Island, Vancouver	,,
Vulcan Iron Works, Ltd.	Industrial Island, Vancouver	,,
Weeb & Gifford	Front St., New Westminster	,,
E. C. Atkins & Co., Ltd.	109 Powell St., Vancouver	,,
A. W. Lepage	773 Georgia St. W., Vancouver	,,
Burrard Iron Works	144 Alexander St., Vancouver	,,
Chappell Bros.	Georgia St., foot of Denman St., Vancouver.	,,
V. M. Dafoe	1200 Powell St., Vancouver	,,
Wesley B. Earle	2102 Eleventh Ave. W., Vancouver	Manufacturing stoves.
H. Disston & Sons, Ltd.	36 Powell St., Vancouver	Machine-shop.
National Cash Register Co. of Canada, Ltd.	524 Pender St. W., Vancouver	,,
Easthope Bros.	1729 Georgia St. W., Vancouver	,,
Empire Manufacturing Co., Ltd.	1201 Sixth Ave. E., Vancouver	,,
Gibbs Tool & Stamping Works	356 Dufferin St. W., Vancouver	,,
Hall Machine Works	1225 Alberni St., Vancouver	,,
Vancouver Stove Works	392 Dufferin St. W., Vancouver	Iron-foundry.
Mainland Engineering	422 Railway St., Vancouver	Machine-shop.
Maritime Motor Car Co., Ltd.	1560 Thirteenth Ave. W., Vancouver.	,,
R. M. Moore & Co., Ltd.	916 Pender St. W., Vancouver	Gas-lighting and machine-shop.
M. O. Olson	Cor. Gore Ave., Vancouver	Machine-shop.
J. Houston	241 Prior St., Vancouver	,,
Ross & Howard Iron Works	1400 Powell St., Vancouver	Machine-shop and foundry.
Simonds Canada Saw Co., Ltd.	554 Beatty St., Vancouver	Machine-shop.
Pearson Iron & Wire Works	City Market, Main St., Vancouver	Ornamental-iron works.
Summer Metal Works	614 Bidwell St., Vancouver	Brass-foundry.
Terminal City Iron Works	1949 Albert St., Vancouver	Machine-shop.
United Motor Agency of B.C.	940 Richards St., Vancouver	,,
Vancouver Brass Works	1304 Keefer St., Vancouver	Brass-foundry.
Vancouver Engineering Works	519 Sixth Ave. W., Vancouver	Machine-shop.
Vancouver Machinery Depot, Ltd.	1156 Sixth Ave. W., Vancouver	,,
Wilson's Brass Foundry	22 Dufferin St. E., Vancouver	Brass-foundry.
Letson & Burpee, Ltd.	198 Alexander St., Vancouver	Machine-shop.
S. M. Morris & Co.	2130 Cedar St., Vancouver	Ornamental-iron works.
North Shore Iron Works, Ltd.	North Vancouver	Machine-shop.
Canadian Water Wheel Co.	Industrial Island, Vancouver	,,
Akerberg & Thomson	Prince Rupert	,,
Rupert Marine Iron Works Co.	,,	,,
Imperial Machine Works	,,	,,
Rose & Wenborn	Steveston	,,
Armstrong Bros.	134 Kingston St., Victoria	,,
Albion Stove Works, Ltd.	Victoria	Manufacturing stoves.
Marine Iron Works	,,	Machine-shop.
Hafer Machine Co., Ltd.	,,	,,
Hutchinson Bros. & Co.	,,	Machine-shop (suspended operations).
Lofts & Bosustow	Wharf and Broughton, Victoria	Machine-shop.
Ramsay's Machine Works	1630 Store St., Victoria	,,
Victoria Machinery Depot	Victoria	,,
Marsland Iron Works	503 Powell St., Vancouver	Foundry.
Ideal Iron Works	123 Powell St., Vancouver	Machine-shop.
Artstrong & Co.	2784 Fourth Ave. W., Vancouver	,,
McAllister Spring Co., Ltd.	1128 Richards St., Vancouver	Manufacturing springs.
Patterson Boiler Works	Heatley Ave., Vancouver	Machine-shop.
Hendry Foundry Co., Ltd.	360 Front St., Vancouver	Iron-foundry.
Progressive Engineering Works	900 Powell St., Vancouver	Machine-shop.
Haskins & Elliott	516 Howe St., Vancouver	,,
Industrial Iron Works	1265 Parker St., Vancouver	Iron-foundry (suspended operations).
Mainland Boiler Works	422 Railway St., Vancouver	Manufacturing steam-boilers.
E. J. Parker	310 Belleville St., Victoria	Machine-shop.
Western Machine Works, Ltd.	1705 Georgia St. W., Vancouver	,,
J. F. Neilson	New Westminster	,,
A. Rogers & Co.	Vernon	,,
Wonder Pump & Engine Co., Ltd.	942 Pender St. W., Vancouver	,,
Wallace Foundry Co., Ltd.	Granville Island, Vancouver	,,
B.C. Iron Works	Victoria	Boiler-makers.
Frank E. Mitchell	672 Alexander St., Vancouver	Machine-works.
Watson Canadian Toys, Ltd.	616 Davie St., Vancouver	Machine-shop.

MACHINE-SHOPS AND FOUNDRIES—*Continued.*

Firm.	Location.	Industry.
Star Brass Foundry	Lorne & Columbia, Vancouver	Brass-foundry.
The Vancouver Spring Co., Ltd.	1368 Richards St., Vancouver	Manufacturing springs.
Cowie Machine Co.	Nanaimo	Machine-shop.
Murray-Latta Machine Works	619 Bidwell St., Vancouver	,,
Vivian Gas Engine Works	1090 Sixth Ave. W., Vancouver	,,
Harold C. Gunson	852 Johnson St., Victoria	,,
Globe Iron Works	1815 Pandora St., Vancouver	,,
John A. Thomson Machinery Co.	Pacific Bldg., Vancouver	,,
Smith Robinson & Co.	1063 Hamilton St., Vancouver	,,
Columbia Iron Works	345 Dufferin St., Vancouver	,,
Vancouver Motor & Cycle Co.	827 Hastings St. W., Vancouver	,,
J. R. Campbell	Kelowna	,,
Earnest Clark Melton	1122 Richards St., Vancouver	,,
W. E. Walter, Ltd.	54 Water St., Vancouver	,,
William Ralph, Ltd.	534 Pender St. W., Vancouver	,,
Clendon Tool & Stamping	135 Hastings St. W., Vancouver	,,
Cawston Machinery Co., Ltd.	605 Bank of Nova Scotia Bldg., Vancouver.	,,
Weir & Taylor	Front St., New Westminster	,,
Maple Leaf Iron Works, Ltd.	425 Alexander St., Vancouver	,,
A. & K. Machine Shop	119 Main St., Vancouver	,,
Samuel R. Jessop	Nanaimo	,,
Canadian Summer Iron Works, Ltd.	1214 Pender St. E., Vancouver	,,
Vancouver Boiler Works	456 Dufferin St., Vancouver	,,
Vancouver Pipe & Foundry Co., Ltd.	500 Beatty St., Vancouver	Foundry.
Denman Engineering Works	613 Dominion Bldg., Vancouver	Machine-shop.
Northern Machinery Co., Ltd.	410 Dominion Bldg., Vancouver	,,
Pacific Standard Motor Works	1687 Georgia St., Vancouver	,,
The Heaton Machine Works	1271 Sixth Ave. W., Vancouver	,,
T. J. Shore Bolt & Nut Manufacturing Co., Ltd.	Vancouver	Manufacturing bolts.

METAL-MINING.

Belmont-Surf Inlet Mines, Ltd.	Surf Inlet	Gold, silver, copper.
Drum Lummon Mines, Ltd.	Vancouver	,, ,, ,,
F. T. Patterson	Refuge Bay	Gold, silver
Taylor Engineering Co., Ltd.	Alice Arm	Silver.
H. W. Heidman	Anyox	Silver, gold.
Granby Consolidated M.S. & P. Co.	,,	Gold, silver, copper.
Mils Donald	Alice Arm	Gold, silver, lead.
J. McAleenan	,,	Silver.
D. L. Pitt	Salmon River	Gold, silver.
Ikeda Mines, Ltd.	Ikeda	Gold, silver, copper.
Smelters Steel Co.	Dean Channel	Iron.
Fred Griffin	Telkwa	Silver, copper.
A. J. Thompson	Usk	Gold, silver, copper.
Mack Orr	Pacific	,, ,, ,,
W. G. Norrie-Lowenthal	New Hazelton	Gold, silver, lead, zinc.
D. C. Simpson	Smithers	Gold, silver, lead.
Frank Guindon	Moyie	Silver, lead.
Thompson & McKinney	Kimberley	,, ,,
Consolidated M. & S. Co.	Moyie	,, ,,
,, ,,	Kimberley	Silver, lead, zinc.
J. E. Stoddart	Toby Creek	Gold, silver, lead.
Paul Denhart	Brisco	Silver, lead.
Wm. Adkins	Field	,, ,,
R. R. Bruce	Invermere	,, ,,
W. A. Krippaehne	Slade Creek	,, ,,
S. S. Fowler	Riondel	,, ,,
D. Brandon	Silverton	,, ,,
W. E. Zwicky	Zwicky	Silver, lead, zinc.
F. R. Wolfle	Ainsworth	Silver, lead.
H. McVicar	,,	Silver, gold, lead.
C. F. Olsen	,,	Silver, lead.
H. Giegerich	,,	,, ,,
Consolidated M. & S. Co.	,,	,, ,,
E. Johnson	Kaslo	,, ,,
J. J. Brochier	Hamill Creek	,, ,,
W. E. Newton	Kaslo	,, ,,
J. C. McDougall	Ainsworth	,, ,,
Kennedy & Bridge	,,	,, ,,
R. J. Hughes	Kaslo	,, ,,
J. W. Smith	Ainsworth	,, ,,
C. F. Caldwell	Kaslo	,, ,,
W. H. Burgess	Kaslo	Gold, silver, lead.
G. A. Petty	Sandon	Silver, lead.
J. P. McFadden	New Denver	Gold, silver, lead.
W. R. Will	,,	Gold, silver.
L. J. McAttee	Silverton	Silver, lead, zinc.
C. Cunningham	Sandon	Silver, lead.
A. W. McCune	,,	Gold, silver, lead.
H. H. Armstrong	Silverton	Silver, lead.
M. J. Byrne	Sandon	,, ,,
Britannia M. & S. Co.	Britannia Beach	Gold, silver, copper.

Metal-mining—*Continued.*

Firm.	Location.	Industry.
C. Cunningham	Sandon	Silver, lead, zinc.
J. P. McFadden	"	Gold, silver, lead, zinc.
Thos. Trenery	Rosebery	Silver, lead.
A. W. B. Allen	Zincton	Silver, zinc.
H. Cleaver	New Denver	Gold, silver, lead.
T. J. Lloyd	"	Gold, silver.
O. V. White	Sandon	Silver, lead.
J. M. Harris	"	" "
W. G. Clark	"	Gold, silver, lead.
W. A. Cameron	Three Forks	Silver, lead.
J. Anderson	Sandon	" "
J. B. White	"	" "
G. H. Aylard	Silverton	Silver, lead, zinc.
H. D. Curtis	Springer Creek	Silver, lead.
C. E. Cartwright	"	Silver.
H. D. Lea	Slocan	Silver, lead.
S. S. Fowler	Enterprise Creek	" "
W. A. Buchanan	Slocan	Gold, silver.
E. F. Roche	Enterprise Creek	Silver, lead.
A. L. McPhee	Slocan	Silver.
W. H. Turner	Nelson	Gold, silver.
W. Waldbeser	Salmo	Silver, lead.
Vincent Development Co.	Granite	Gold, silver, copper.
Consolidated M. & S. Co.	Kokanee	Silver, lead.
A. D. Westby	Erie	Gold, silver.
H. E. Forster	Burton	Gold, silver, lead.
F. S. Peters	Rossland	Gold, silver, copper.
John S. Baker	"	" " "
P. S. Couldrey	"	" " "
J. W. Evans	Renata	Silver, copper.
Consolidated M. & S. Co.	Rossland	Gold, copper.
W. B. Dornberg	Illecillewaet	Gold, silver, lead.
J. Anderson	Ferguson	" " "
W. J. Banting	Lightning Peak	Silver, lead.
Consolidated M. & S. Co.	Kennedy Creek	Fluorite.
Lewis Johnson	Grand Forks	Gold, silver.
F. F. Ketchum	Wallace Mountain	Gold, silver, lead.
P. E. Crane	Beaverdell	" " "
J. P. Kelly	"	Silver.
G. Hambly	"	Silver, lead.
L. Sortoine	Greenwood	Gold, silver.
J. McKellar	Wallace Mountain	Silver, lead.
Consolidated M. & S. Co	Eholt	Gold, silver, copper.
Granby Consolidated M.S. & P. Co.	Phoenix	" " "
Canada Copper Corporation, Ltd.	Greenwood	" " "
E. G. Cummings	Wallace Mountain	Silver, lead.
A. J. Morrison	Greenwood	Gold, silver, lead.
H. B. Morley	Beaverdell	" " "
E. Nordman	"	Silver.
J. Cunningham	Phoenix	Gold, silver, copper.
E. Williamson	Kettle River	Gold, silver, lead.
G. A. Rendell	Lightning Peak	Silver, lead.
D. McEachern	Olalla	Gold, silver, copper.
E. W. Condit	Keremeos	Gold, silver.
Gomer P. Jones	Hedley	Gold, arsenic.
F. F. Foster	Princeton	Silver, copper.
F. M. Hawkes	Stump Lake	Gold, silver, lead, copper.
F. Calvert	Kruger Mountain	Magnesium sulphate.
R. R. Hedley	Stump Lake	Gold, silver, lead.
J. G. Miller	Basque	Magnesium sulphate.
A. Wallinder	Kamloops	Gold, silver, copper.
C. E. Max	"	Silver, lead.
W. Thompson	Yale	Gold, silver.
Stewart-Calvert Co.	Clinton	Magnesium sulphate.
F. A. Brewer	Cadwallader Creek	Gold.
A. F. Noel	"	Gold, silver.
A. Ferguson	"	" "
E. J. Donohue	Britannia Beach	Gold, silver, copper.
James Forbes	Vananda	Silver, copper.
James Raper	"	" "
F. H. Rosher	Quathiaski	Gold, silver, copper.
W. H. Lee	Vananda	Iron.
G. H. Kilburne	Cowichan Lake	Gold, silver, copper.
C. H. Dickie	"	Manganese.

Manufacture of Paints, Turpentine, and Oil-refineries.

British American Paint Co., Ltd.	Victoria	Manufacturing paint.
Staneland Co., Ltd.	"	" "
Martin-Senour Co., Ltd.	1505 Powell St., Vancouver	" "
Pacific White Lead Co., Ltd.	Industrial Island, Vancouver	Manufacturing white lead.
Ayers Varnish Co.	Vancouver	Manufacturing paint and varnish.

MANUFACTURE OF PAINTS, TURPENTINE, AND OIL-REFINERIES—*Continued.*

Firm.	Location.	Industry.
B.C. Impermeate Co., Ltd.	328 Rogers Bldg., Vancouver	Manufacturing a composition rendering substances impervious to damp.
British Columbia Refining Co., Ltd.	1043 Hamilton St., Vancouver	Oil-refinery.
Crown Paint Co.	24 Cordova St. E., Vancouver	Manufacturing paint.
Henry Darling	28 Powell St., Vancouver	,, ,,
Imperial Oil Co., Ltd.	Ioco	Oil-refinery.
Dust Control Co.	2246 Commercial Drive, Vancouver	Manufacturing floor-oil and mops.
Douglas Fir & Turpentine Co., Ltd.	Vancouver	Manufacturing turpentine.

PULP AND PAPER MILLS.

Powell River Co., Ltd.	Powell River	Pulp and paper.
Pacific Mills, Ltd.	Ocean Falls	,, ,,
Whalen Pulp & Paper Mills, Ltd.	Port Alice	Pulp.
,, ,, ,,	Swanson Bay	,,
,, ,, ,,	Mill Creek, Howe Sound	,,
Western Canada Pulp & Paper Co.	Port Mellon	,,
Beaver Cove Pulp & Lumber Co.	Beaver Cove	,,

SASH AND DOOR FACTORIES.

John Arnot & Sons	Vancouver	Sash and door factory.
S. C. Smith Lumber Co., Ltd.	Vernon	,, ,, ,,
James Brooks Woodworking Co., Ltd.	East Burnaby	,, ,, ,,
Kamloops Sash & Door Factory	Kamloops	,, ,, ,,
Nelson Sash & Door Factory	Nelson	,, ,, ,,
T. H. Waters Co.	,,	,, ,, ,,
Galbraith & Sons	New Westminster	,, ,, ,,
Cedar Cove Sash & Door Co., Ltd.	1101 Sixth Ave. W., Vancouver	,, ,, ,,
F. J. Becker	Armstrong	,, ,, ,,
Cornish & Cooper	245 Dufferin St., Vancouver	,, ,, ,,
Johnson Sash & Door Factory	854 Sixth Ave. W., Vancouver	,, ,, ,,
E. H. Shockley	Prince Rupert	,, ,, ,,
McLeod Dunn Watson Co., Ltd.	1260 Charles St., Vancouver	,, ,, ,,
Canada Sash & Door Co.	136 Lorne St. W., Vancouver	,, ,, ,,
Reynolds Sash & Door Co.	170 Cordova St. E., Vancouver	,, ,, ,,
Robertson & McLaughlin	1758 Fifteenth Ave. E., Vancouver	,, ,, ,,
Mark Arbuthnot	101 Dufferin St., Vancouver	,, ,, ,,
R. D. Helmer	996 Sixth Ave. W., Vancouver	,, ,, ,,
Reid Sash & Door Factory	1635 Third Ave. W., Vancouver	,, ,, ,,
Nanaimo Lumber Co., Ltd.	Nanaimo	,, ,, ,,

SAWMILLS AND SHINGLE-MILLS, ETC.

Abbotsford Timber & Trading Co.	Abbotsford	Sawmill.
A. J. Pringle	Adelphi P.O.	,,
O. J. Hoffstram	Rolla	,,
Sugar Loaf Valley Lumber Co., Ltd.	Kamloops	,,
Frederick Brand	Alberni	,,
Alert Bay Sawmills	517 Granville St., Vancouver	Sawmill (suspended operations).
John W. McDonnell, Ltd.	Fanny Bay	Shingle-mill (suspended operations).
Sovereign Lumber Co., Ltd.	Kamloops	Sawmilling.
J. E. Murphy & Co.	Ladner	,,
Armstrong Sawmill	Armstrong	,,
Chas. Hoover	,,	,,
George MacKenzie	Nelson	Sawmill (suspended operations).
Diamond Lumber & Shingle Co., Ltd.	Revelstoke	Shingle-mill.
North Pacific Lumber Co., Ltd.	Barnet	Planing-mills.
McVicar Shingle Co.	Burquitlam	Shingle-mill.
Barriere Lumber Co.	Barriere	Sawmill (suspended operations).
F. Hendricks	Bella Coola	Ditto.
Nicola Pine Mills, Ltd.	Merritt	Sawmill.
Seabird Shingle Co., Ltd.	Walcach	Shingle-mill.
Hadden Shingle Co., Ltd.	White Rock	,,
R. B. McLean Lumber Co.	Cloverdale	Sawmill.
Guarantee Sawmill Co.	Courtenay	Sawmill (suspended operations).
Empire Shingle Co.	Craig's Crossing	Shingle-mill (suspended operations).
Daniel Kilpatrick	Courtenay	Sawmill.
Coombs Shingle Mill	Coombs	Shingle-mill.

SAWMILLS AND SHINGLE-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
Longworth Lumber Co.	Cariboo	Sawmill.
Red Mountain Lumber Co.	Penny	„
Lumber Products, Ltd.	902 Credit Foncier Bldg., Vancouver.	Sawmill (suspended operations).
Calyson Lumber Co.	Cloverdale	Sawmill.
Canyon City Lumber Co., Ltd.	Creston	„
Highland Shingle Mills	Capital Hill P.O.	Shingle-mill.
Baskin & Stedman, Ltd.	Nelson	Sawmill.
Reynolds Co., Ltd.	Pacific Bldg., Vancouver	„
Okanagan Sawmill, Ltd.	Enderby	„
The Newlands Sawmills, Ltd.	Prince George	„
Fraser Mills Shingle Co.	Fraser Mills	Shingle-mill.
Canadian Western Lumber Co., Ltd.	„	Sawmill.
C. Waters	Fruitvale	„
The Columbia River Lumber Co., Ltd.	Golden	„
Thomas Alton	Galena	„
Pioneer Shingle Mills	Victoria Drive, Vancouver	Shingle-mill.
Norris Lumber & Box Co., Ltd.	Grand Forks	Sawmill and plainer.
Prince Rupert Lumber Co.	Prince Rupert	Sawmill.
The Saloomt Lumber Co.	Bella Coola	„
Dr. R. H. Barker	Happy Valley	Sawmill (suspended operations).
East Kootenay Lumber Co.	Jaffray	Sawmill.
E. Bashaw Lumber Co.	Dewey	„
Arrow Lakes Lumber Co.	Kamloops	„
Monarch Lumber Co.	„	Sawmill (suspended operations).
Acme Shingle Co.	707 Metropolitan Bldg., Vancouver	Shingle-mill.
P. J. Pearson	Nanaimo	Sawmill (suspended operations).
Northern Mills & Timber Co., Ltd.	405 Winch Bldg., Vancouver	Sawmill.
Crawford Bros.	Kelowna	„
Kelowna Sawmills Ltd.	„	„
Kamloops Sawmills	Kamloops	„
Cowie & Stanhope	Duncan	„
Lumby Sawmills, Ltd.	Lumby	„
Lakelse Lumber Co., Ltd.	Amsbury	„
Wm. Boyd	Halcyon	„
Louis J. Duval	Royal Oak	„
Highland Lumber Co., Ltd.	Cowichan Station	„
Phillips-Hoyt Lumber Co.	McKay Station	„
Ernest D. Mayhue	Malakwa	Shingle-mill.
Eburne Saw Mill, Ltd.	Marpole	Sawmill.
Andrew McGeran	Merritt	„
J. A. Menzies, Ltd.	„	„
W. Powers & Lequme	Midway	„
Hutton Mills	Hutton	„
Cloverdale Milling Co.	Murrayville	Shingle-mill.
Lincoln Mill	New Westminster	Sawmill.
Lowrie Lumber Co.	New Masset, Graham Island	Sawmill (suspended operations).
H. G. Lambert Co., Ltd.	Nelson	Sawmill.
Mankin Lumber & Pole Co.	Hall	„
Western Box & Shingle Co.	Nelson	Mill.
The King Farris Lumber Co., Ltd.	Newton	Sawmill.
Iowa Shingle Co.	806 Yorkshire Bldg., Vancouver	Shingle-mill.
Hammond Cedar Co., Ltd.	New Westminster	Sawmill.
Shull Lumber & Shingle Co., Ltd.	„ „	Shingle-mill.
Beaver River Lumber Co., Ltd.	401 Westminster Trust, New Westminster.	Sawmill.
British Columbia Manufacturing Co.	New Westminster	„
Brunette Sawmills Co., Ltd.	„ „	„
Bucklin Lumber Co., Ltd.	„ „	„
Timberland Lumber Co., Ltd.	„ „	„
Westminster Mill Co., Ltd.	„ „	Manufacturing shingles.
Dominion Shingle & Cedar Co., Ltd.	Vancouver	„ „
Alberta Lumber	Sixth and Willow, Vancouver	Sawmill.
Barclay Shingle Mills	924 Metropolitan Bldg., Vancouver	Shingle-mill.
B.C. Box Co., Ltd.	Eburne	Sawmill and box-factory.
B.C. Fire & Cedar Lumber Co., Ltd.	Sixth and Laurel St., Vancouver	Sawmill and planing-mill.
British Columbia Mills Timber & Trading Co.	Foot of Dunlevy Ave., Vancouver	Sawmill.
The Alert Bay Sawmills	Alert Bay	Sawmill and logging.
Burrard Sawmills, Ltd.	1211 Dominion Bldg., Vancouver.	Sawmill.
Canada Lumber & Timber Co.	Foot of Smythe St., Vancouver	„
Canada Shingle Co., Ltd.	P.O. Box 212, Vancouver	Shingle-mill.
Canadian Robert Dollar Co., Ltd.	Dollarton	Sawmill.
Cedar Cove Sash & Door Co., Ltd.	1101 Sixth Ave. W., Vancouver	„
Best Grade Shingles, Ltd.	901 Sixth Ave. W., Vancouver	Shingle-mill.
Craig Taylor Lumber	909 Dominion Bldg., Vancouver	Sawmill.
Dominion Creosoting & Lumber Co., Ltd.	P.O. Box 143 Vancouver	„
Fred M. Singer Co.	198 Hastings St. W., Vancouver	„
False Creek Lumber Co.	935 Sixth Ave. W., Vancouver	„
Vancouver Cooperage Co.	Foot of Beatty St., Vancouver	Sawmill and cooperage.
J. Hanbury & Co., Ltd.	Fourth Ave. and Granville St., Vancouver	Sawmill.
Hastings Shingle Manufacturing Co.	1355 Powell St., Vancouver	Manufacturing shingles.

SAWMILLS AND SHINGLE-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
Huntting Merritt Lumber Co., Ltd.	P.O. Box 249, Vancouver	Shingle-mill.
Lake Lumber Co., Ltd.	Qualicum Beach	Sawmill.
Robert McNair Shingles Co.	670 Thurlow St., Vancouver	Shingle-mill.
Pacific Box Co., Ltd.	Foot of Smythe St., Vancouver	Sawmill.
Rat Portage Lumber Co., Ltd.	Vancouver	,,
Robertson & Hackett Sawmills	,,	,,
South Shore Lumber Co., Ltd.	,,	,,
Nasmyth Lumber Co.	,,	Shingle-mill.
Vancouver Cedar Mills	,,	Sawmill and shingle-mill.
Vancouver Lumber Co., Ltd.	,,	Sawmill and planing.
Star Lumber Co.	1017 Metropolitan Bldg., Vancouver	Sawmill.
M. P. Batterill	Clinton	Sawmill (operated by Northern Construction Co.).
K. Lier Lumber Co.	Penticton	Sawmill.
Alberni Pacific Lumber Co., Ltd.	Port Alberni	Sawmill (suspended operations).
Sewall Lumber & Trading Co., Ltd.	1312 Standard Bldg., Vancouver.	Sawmill.
Burden & Watson	Crawford Bay	,,
Maple Ridge Lumber Co.	Port Haney	,,
Thurston Faville, Ltd.	Port Moody	,,
Big Bay Lumber Co.	Georgetown Mills	,,
Brooks, Bidlake & Whittall, Ltd.	806 Yorkshire Bldg., Vancouver	Shingle-mill.
Pitt River Shingle Co., Ltd.	Coquitlam	,,
Alberni Shingle Co., Ltd.	Port Alberni	Sawmill (suspended operations).
Forest Mills of B.C., Ltd.	Revelstoke	Sawmill.
Revelstoke Lumber Co., Ltd.	Pingston Creek via Arrowhead	,,
R. H. Sawyer	Revelstoke	,,
McNair & Grahame	Rosedale	Shingle-mill.
Hamilton Lumber Mills, Ltd.	Royal Oak	Sawmill.
Stoltze Manufacturing Co., Ltd.	912 Dominion Bldg., Vancouver	Shingle-mill.
Kootenay Shingle Co., Ltd.	Selma	,,
William Crowston & Sons	Soda Creek	Sawmill.
Sardis Shingle Co., Ltd.	Port Moody	Manufacturing of shingles.
G. B. Ferguson & Co.	Six-mile Creek	Sawmill.
W. B. Charters	Sooke	,,
W. H. Mager	Salmon Arm	,,
Sperling Lumber & Shingle Co.	Sperling	,,
Day Shingle Manufacturing Co.	Dewdney	Manufacturing shingles.
Newport Sawmills, Ltd.	Squamish	Sawmill.
H. M. Ellis, Ltd.	118 Pacific Bldg., Vancouver	,,
Surrey Shingle Manufacturing Co., Ltd.	Sullivan (B.C.E. Rly.)	Shingle-mill.
I. R. Reilly & Co.	Tappen	Sawmill.
George Little	Terrace	,,
Eldorado Lumber Co., Ltd.	330 Seymour St., Vancouver	Sawmilling and logging (suspended operations).
McKee & Milnes	Green Point Rapids	Manufacturing shingles.
John L. Rutton Sawmills	Alexa Lake	Sawmill.
Ross Saskatoon Lumber Co.	Waldo	,,
Waneta Power Co., Ltd.	Waneta	,,
Summerland Lumber Co., Ltd.	West Summerland	,,
Campbell River Lumber Co., Ltd.	White Rock	,,
Straits Lumber Co.	Nanoose	,,
North River Lumber Co., Ltd.	Thunder River	Sawmill (suspended operations).
A. Tomkinson	Grindrod	Sawmill.
Cameron Lumber Co., Ltd.	Victoria	,,
Genoa Bay Lumber Co.	,,	,,
James Leigh & Sons	,,	,,
Lemon, Gonnason & Co.	,,	,,
Moore-Whittington Lumber Co., Ltd.	,,	,,
Shawnigan Lake Lumber Co.	,,	,,
McCarter Shingle Co.	,,	Shingle-mill.
Albert Gorton	Foot of Birch St., Vancouver	Shingle-mill, etc.
Peers & Anderson	Foot of Victoria Drive, Vancouver	Shingle-mill.
C. T. McPhalen & Co.	Hatzic	Sawmill.
Carter Bros. Lumber Co.	Vananda	,,
M. A. Hayes	Armstrong	Sawmill (suspended operations).
B.C. Iowa Lumber Co., Ltd.	506 Yorkshire Bldg., Vancouver	Shingle-mill (suspended operations).
Northern Pacific Logging Co., Ltd.	606 Vancouver Block, Vancouver.	Shingle-mill.
Mayo Lumber Co., Ltd.	Duncan	Sawmill.
Giscome Lumber Co., Ltd.	Pacific Bldg., Vancouver	Sawmill, etc.
Stuart Lake Shingle Co.	Squamish	Shingle-mill.
McCormich & Orser	South of Revelstoke	Sawmill.
B.C. Cattle Co., Ltd.	c/o W. C. Sampson, 1219 Langley St., Victoria	Sawmill (suspended operations).
Sidney Mill, Ltd.	Sidney	Sawmill.
Bentley Lumber Co.	Golden	Sawmill, etc.
Northern Lumber & Mercantile Co., Ltd.	Prince George	Sawmill.
Superior Spruce Mills	817 Metropolitan Bldg., Vancouver	Sawmill (suspended operations).
Masset Inlet Lumber Co.	c/o Weir Machinery Co., 1396 Richards St., Vancouver	Ditto.
Anthony A. Rerrie	Sperling	Sawmill, etc.

SAWMILLS AND SHINGLE-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
Smith, Hutchinson Lumber Co., Ltd. ..	909 Dominion Bldg., Vancouver..	Sawmill.
Princeton Coalmont Sawmill	Princeton	Sawmill (suspended operations).
A. J. Graham	Graham's Landing	Sawmill.
E. Kagetsu & Co.	126 Cordova St. E., Vancouver..	,,
Sutton & Foote	Trout Lake	Shingle-mill.
The McLay Sawmill	Duncan	Sawmill, etc.
Cedars, Ltd.	510 North West Bldg., Vancouver	Sawmill.
Aleza Lake Mills, Ltd.	Aleza Lake	Sawmill, etc.
Graham Island Spruce & Cedar Co. ...	Prince Rupert	Sawmill.
Hansard Lake Lumber Co., Ltd.	Prince George	Sawmill, etc.
Croydon Lumber Co., Ltd.	Croydon	,,
Harbour Lumber Co., Ltd.	Foot of Salisbury Drive, Vancouver.	Sawmill.
Gwilt Lumber Co., Ltd.	Courtenay	,,
Bainbridge Lumber Co.	Bainbridge	,,
Loos Lumber Co.	Loos	Sawmill, etc.
Tynehead Lumber Co.	323 Hastings St. E., Vancouver..	,,
P. Bain	Silverdale	Sawmill.
Harrison Lake Shingle Co.	Harrison Hot Springs P.O.	Shingle-mill, etc.
Pacific Tie & Timber Co.	529 Pender St. W., Vancouver..	Sawmill, etc.
Electric Lumber Co.	c/o Weir Machinery, Vancouver	Sawmill.
Renata Lumber Co.	Renata	,,
Red Cedar Shingle Co.	Guilford	Shingle-mill.
Penny Lumber Co., Ltd.	Penny	Sawmill, etc.
Mountain Sawmills, Ltd.	Kamloops	Sawmill.
Cranbrook Sawmills, Ltd.	Fort Steele	,,
The Milestone Lumber Co.	Castlegar	Sawmill, etc.
Joseph Gawley	Keefers	Sawmill.
Krim Singh	Strawberry Hill P.O.	Sawmill (suspended operations).
Moses Bouchier	Hatzic Prairie, Durien P.O.....	Sawmill.
Red Cedar Shingle Co., Ltd.	Foot of Kerr Road, South Vancouver.	Manufacturing of shingles.
North Arm Lumber Co.	South Vancouver	Sawmill.
Harry Hobson	322 Second St. E., North Vancouver.	Shingle-mill.
A. E. Mann	827 Royal Ave., New Westminster	Sawmill, etc.
J. E. Campbell	Avola	Shingle-mill (suspended operations).
Barr Bros.	Mission City	Shingle-mill, etc.
Silverdale Lumber Co., Ltd.	Silverdale	Sawmill,, etc.
Sunrise Lumber Co.	Nanaimo	Sawmill.
Gerrard Lumber Co., Ltd.	Gerrard	Sawmill, etc.
Finley McIntosh, McDonald Prendergast, Dingee	Coalmont	Sawmill (suspended operations).
Hamilton Shingles, Ltd.	Arrowhead	Shingle-mill.
I. B. Dennison	Nakusp	Sawmill, etc.
Grand Forks Sawmills, Ltd.	Grand Forks	Sawmill (suspended operations).
North Star Lumber Co., Ltd.	Kamloops	Ditto.
E. C. Walsh Lumber Co., Ltd.	North Vancouver	Sawmill.
J. W. R. & W. J. Potter	Box 566, Victoria	,,
Rex Shingle Co., Ltd.	Esplanade and St. George, North Vancouver.	Manufacturing shingles.
Nakusp Lumber Co., Ltd.	Nakusp	Sawmill.
William Lyne	Cariboo Road	Sawmill (suspended operations).
Leask & Boyter	Wasa	Sawmill, etc.
Kenney Bros. Lumber Co.	Terrace	Sawmill (suspended operations).
Gilroy Shingle Co., Ltd.	1129 Standard Bank Bldg., Vancouver.	Shingle-mill.
R. S. Wright, Ltd.	Usk	Sawmill.
Edham Shingle Mills, Ltd.	405 Metropolitan Bldg., Vancouver	Shingle-mill.
Boulder Lumber Co.	Boulder Mill via Nelson	Sawmill.
Port Clements Box & Lumber Co., Ltd.	Port Clements	Sawmill (suspended operations).
William Kernighan	Salmon Arm	Sawmill.
Melrose Shingle Co., Ltd.	White Rock	Shingle-mill.
Frank F. White & J. C. Farris	403 Central Bldg., Victoria	Sawmill.
Thos. Gwilt Shingle Co., Ltd.	Courtenay	Shingle-mill, etc.
Courtenay Lumber Co., Ltd.	,, ...	Sawmill.
Western Hemlock Mills, Ltd., c/o Wilson & Brady	Winch Bldg., Vancouver	,,
McKee & Campbell	Langley Prairie	,,
B.C. Shingle Co.	Sperling	Shingle-mill.
Nelson Lumber Manufacturing Co.	Nelson	Sawmill (suspended operations).
The Gibson Lumber & Shingle Co.	1022 Metropolitan Bldg., Vancouver.	Sawmill, etc. (assigned).
W. H. Hollard	Lynn Creek	Sawmill, etc. (suspended operations).
Royal Lumber Co.	Usk	Sawmill.
Keefe Lumber Co.	Francois Lake	,,
Quesnel Timber & Trading Co.	Quesnel	,,
Silver Creek Lumber Co.	807 Dominion Bldg., Vancouver..	,,

SAWMILLS AND SHINGLE-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
National Shingle Co.	407 Hastings St. W., Vancouver	Shingle-mill.
The Border Lumber Co., Ltd.	Deep Creek	Sawmill (suspended operations).
F. M. Smith	Door	Sawmill, etc.
Major C. W. Justice	Ganges	"
Lafontaine Bros.	Golden	Sawmill (suspended operations).
Port Hardy Shingle Co.	Port Hardy	Shingle-mill (suspended operations).
Nolan Lumber Co.	Flagstone	Sawmill (suspended operations).
The Anthony Lumber Co., Ltd.	Aleza Lake	Sawmill.
Economy Lumber Co., Ltd.	Courtenay	Sawmill, etc.
Telkwa Lumber Co.	Telkwa	Sawmill.
F. W. Engeman	Jesmond	Sawmill (suspended operations).
Gulf Sawmills, Ltd.	Seechelt	Shingle-mill.
Brooks & Brooks	Otter	"
Fletcher & Richards Lumber Co., Ltd.	Courtenay	Sawmill.
E. B. de la Giroday	2757 Cambridge St., Vancouver	Sawmill, etc.
William MacAndrew	Dewar's Wharf, Vancouver	Manufacturing shingles.
Mission Shingle Co.	Mission City	Manufacturing shingles (assigned).
Glenwood Shingle, Tie & Lumber Co.	307 Yorkshire Bldg., Vancouver	Manufacturing shingles.
Coquitlam Shingle Co.	123 Fourteenth Ave. W., Vancouver.	Manufacturing shingles (suspended operation).
Guicheon Cove Lumber Co., Ltd.	702 B.C. Permanent Loan Bldg., Victoria.	Sawmill (suspended operations).
Wall Lillos Shingle Co.	766 Fourteenth Ave. E., Vancouver.	Shingle-mill (suspended operations).
Mills Bros.	Langley Prairie	Shingle-mill.
Campbell & Osborne	Toba Inlet	Sawmill.
Premium Shingle Co., Ltd.	924 Vancouver Bldg., Vancouver	Shingle-mill.
Qualicum Lumber Co.	512 Standard Bldg., Vancouver	Sawmill.
G. O. Buchanan	1207 Seventh Ave. W., New Westminster.	"
B.C. Lath & Timber Products, Ltd.	Sperling	Sawmill (suspended operations).
Norwood Bros.	Quesnel	Ditto.
E. Mallandaine	Creston	Sawmill.
Bevan Lumber Co., Ltd.	Bevan	Shingle-mill.
C. V. Humphrey & O. E. Butler	Capilano	Sawmill.
Harrison Bay Co., Ltd.	New Westminster	Shingle-mill.
Burnaby Lumber Co.	Metropolitan Bldg., Vancouver	Shingle-mill (suspended operations).
Haney Lumber & Lath Mills, Ltd.	Yennadon	Sawmill.
The Tyee Lumber Co., Ltd.	Tyee Siding	Sawmill (suspended operations).
T. J. Kirkpatrick	Terrace	Sawmill.
Madina Lumber Co., Ltd.	318 Pacific Bldg., Vancouver	Sawmill (suspended operations).
Lion Shingle Co., Ltd.	708 Pacific Bldg., Vancouver	Shingle-mill.
M. & M. Sawmill Co., Ltd.	Courtenay	Sawmill.
Cedar Cove Operations, Ltd.	806 Yorkshire Bldg., Vancouver	Planing-mill.
Charlotte Islands Spruce Products, Ltd.	604 Yorkshire Bldg., Vancouver	Shingle-mill.
Masset Timber Co., Ltd.	708 Pacific Bldg., Vancouver	Sawmill.
Wm. D. Lukens	Palling	"
The Frondeg Lumber Co.	Cobble Hill	"
Northern B.C. Timber Co.	Smithers	"
W. H. Scoutin	Kamloops	"
Aldergrove Sawmills, Ltd.	Aldergrove	"
Yellow Fir Lumber Co.	Duncan	"
Chase & Campbell Shingle Co., Ltd.	40 Inns of Court Bldg., Hamilton St., Vancouver	Shingle-mill (suspended operations).
Maddaugh, Huggard & Nichols	Fernridge	Sawmill.
Baker, Malcolm & Doherty	Penticton	"
H. McD. Ferguson	Haney	"
McNair Lumber & Shingle Co., Ltd.	North Vancouver	Shingle-mill.
The Brennan Lake Lumber Co., Ltd.	Wellington	Sawmill.
James Taylor	Hope	Sawmill (suspended operations).
The Westminster Shook Mills, Ltd.	New Westminster	Sawmill.
Webber Lumber Co.	Port Haney	"
Webster, Black & Co.	Fraser Lake	"
Townsite Lumber Co., Ltd.	Foot of Windermere St., Vancouver.	Sawmill (suspended operations).
Acme Lath Co.	2022 Douglas St., Victoria	Lath-mill.
North Shore Shingles, Ltd.	Cor. Esplanade and St. George's St., North Vancouver.	Shingle-mill.
W. A. MacDonald Lumber Co.	Barriere	Sawmill.
Dimension Lumber Co., Ltd.	401 Westminster Trust Bldg., New Westminster.	Sawmill, etc.
Sicamous Saw Mills, Ltd.	306 Victoria St., Kamloops	Sawmill, etc. (suspended operations).
Keen Shingle Co.	Port Alberni	Shingle-mill (suspended operations).
Errington Lumber Co.	Coombs	Sawmill.

Sawmills and Shingle-mills, etc.—*Continued.*

Firm.	Location.	Industry.
Somerton & Profitt	Powell River	Shingle-mill.
Myntti, Puska, Lata Make & Karst	Webster's Corner	Sawmill.
Fanny Bay Lumber Co., Ltd.	Cumberland	,,
Brian Briscoe	Prince George	,,
Henry Proctor	Cowichan Bay	,,
Empire Sawmills, Ltd.	405 Bank of Nova Scotia Bldg., Vancouver.	,,
Diamond Lath Mills, Ltd.	Port Hammond	Lath-mill.
Champion Shingle Co., Ltd.	8017 Columbia Ave., South Vancouver.	Shingle-mill (suspended operations).
Harrison, Bates & Hanwell	Port Hammond	Lath-mill.
Green River Lumber Co.	Rethel	Sawmill.
Kettle Valley Tie & Timber Co.	Penticton	Sawmill, etc.
North Vancouver Lath Co.	North Vancouver	Manufacturing Lath.
Union Shingle Co., Ltd.	Fraser Ave. and River Road, South Vancouver.	Manufacturing Shingles.
Sahtlam Lumber Co., Ltd.	Duncan	Sawmill.
Wilson Shingle Co., Ltd.	Qualicum	Shingle-mill (suspended operations).
Hope Sawmill Co.	Floods P.O.	Sawmill.
Red Mountain Shingle Co.	Silverton	Shingle-mill (suspended operations).
Naruke & Sato	West Summerland	Sawmill.
Forest & Mines Products, Ltd.	Fort Steele	,,
Tansor Lumber Co., Ltd.	Duncan	,,
Lawrence & Workenaw	Stewart	Sawmill (suspended operations).
The Bonsall Creek Lumber Co., Ltd.	Westholme	Sawmill.
North West Lumber Co., Ltd.	21 Pender St. W., Vancouver	,,
Gilroy McKay Lumber Co., Ltd.	1129 Standard Bldg., Vancouver.	,,
The Laidlaw Shingle Co.	Waleach	Shingle-mill.
Erie Lumber Co.	Erie	,,
McPhalan Lumber Co., Ltd.	Mission	Sawmill (suspended operations).
Dominion Lumber Co., Ltd.	Wire Cache	Sawmill.
Osoyoos Lumber Co.	Graham's Ranch, Sidney	Sawmill, etc.
The Ruskin Operations, Ltd.	Stave Falls	Shingle-mill.
Frank A. Willis	Dewar's Wharf, Vancouver	Manufacturing shingles.
Douglas Fir Products & Shingles, Ltd.	620 Pacific Bldg., Vancouver	Shingles.
The Holt Creek Lumber Co.	Duncan	Sawmill, etc.
Saturna Saw & Planing Mills	Saturna	Sawmill.
Logan-Garcin Lumber Co.	Victoria	,,
De Blac & Bessette	Lumby	,,
Flanagan Bros.	Cloverdale	,,
The Prospect Lumber Co.	R.R. No. 3, Victoria	Sawmill (suspended operations).
Renfrew Lumber Co., Ltd.	654 Yates St., Victoria	Ditto.
The White Rock Tie & Lumber Co.	White Rock	Sawmill.
Lumber Specialty, Ltd.	406 Winch Bldg., Vancouver	Lath-mill (assigned).
W. T. Stevens	Westbank	Sawmill.
D. Rogers	Cloverdale	,,
T. R. Davis	Terrace	,,
The Union Cedar Mills, Ltd.	414 Yorkshire Bldg., Vancouver	Shingle-mill.
H. L. Latremouille	Louis Creek	Sawmill.
Nicol Lumber Co.	Vedder Crossing	,,
Thorpe & Lancaster	Nelson	,,
John Renwisk & Son	Crescent Valley	Sawmill, etc.
The E. & M. Lumber Co.	Merville	Sawmill.
H. J. Parker	Merritt	,,
R. T. Burnett & A. Stewart	Capilano	,,
A. S. Rutherford & Louis Hanson	Prince George	,,
The Bailey Hobbs Lumber Co., Ltd.	114 Crown Bldg., Vancouver	Shingle-mill.
John Freeman	Kamloops	Gasolene sawmill.
Newton Sawmill	Newton P.O.	Sawmill (suspended operations).
Joyce & Johnston	Quesnel	Sawmill.
Lorne E. Butt Lumber & Shingle Mills, Ltd.	Mission City	Shingle-mill.
McArthur & Co.	Midway	Sawmill.
Percy Cotton	Adelphi P.O.	,,
Comaplix Mills, Ltd.	Comaplix	,,
The Chase Creek Lumber Co., Ltd.	Shuswap	,,
Baskin Gevurtz Lumber Co., Ltd.	Nelson	Shingle-mill (suspended operations).
John C. Dill	325 Howe St., Vancouver	Shingle-mill.
H. M. Hornby	Cloverdale	Sawmill.
W. J. McIntyre	Sicamous	,,
Neilson Shingle Co.	Silverdale	Shingle-mill (suspended operations).

SHEET-METAL WORKS.

Firm.	Location.	Industry.
Eburne Sheet Metal Works	Marpole	Sheet-metal works.
F. W. Hamilton	1618 Commercial St., Vancouver	" "
Ansell Sheet Metal Works	2215 Thirteenth Ave. W., Vancouver.	" "
E. L. Armstrong	1329 Granville St., Vancouver	" "
A. J. Barker	516 Pender St. W., Vancouver	" "
Grandview Sheet Metal Works	1685 Venables St., Vancouver	" "
Johnson Lee	826 Dunsmuir St., Vancouver	" "
James H. Hatch	69 Cordova St. W., Vancouver	" "
H. & H. Sheet Metal Works	735 Richards St., Vancouver	" "
Frank Little Sheet Metal Works	1168 Seymour St., Vancouver	" "
John K. Miller Co., Ltd.	337 Dufferin St., Vancouver	" "
J. R. Tacey & Son	1160 Seymour St., Vancouver	" "
Pacific Sheet Metal Works, Ltd.	523 Seventh Ave., W., Vancouver	" "
B.C. Sheet Metal Works	Victoria	" "
Pacific Sheet Metal Works, Ltd.	"	" "
Victoria Sheet Metal Works	434 Kingston St., Victoria	" "
Sixth Avenue Sheet Metal Works	Prince Rupert	" "
Terminal Sheet Metal Works, Ltd.	1043 Pender St., Vancouver	" "
Steen & Longwill	Prince Rupert	" "
Campbell & Grill	1238 Seymour St., Vancouver	" "
New Idea Sheet Metal Works	757 Beatty St., Vancouver	" "
Central Sheet Metal Works	560 Cambie St., Vancouver	" "
Nelson Hardware Co.	Nelson	" "
Rowe's Sheet Metal Works	Prince George	" "
Columbia Copper & Sheet Steel Manufacturing Co.	2421 Scotia St., Vancouver	Manufacturing sheet copper and steel.
Latimer & Sons, Ltd.	550 Main St., Vancouver	Sheet-metal works.
D'Arcy B. Plunkett	2519 Rock Bay Ave., Victoria	" "
A. W. Schwan	8 Cordova St. E., Vancouver	" "
McLeod Sheet Metal Works	1042 Richards St., Vancouver	" "
Smith & Kirkland	1537 Kingsway, Vancouver	" "
Vancouver Sheet Metal	1090 Hamilton St., Vancouver	" "
The Metallic Heating & Ventilating Co., Ltd.	2301 Cambie St., Vancouver	" "
British Columbia Ceiling & Roofing Co., Ltd.	823 Seventh Ave. W., Vancouver	" "
C. W. Grafton	153 Keefer St., Vancouver	" "

TANNERIES, MANUFACTURE OF LEATHER GOODS, GLOVES, AND SHOES.

Sandell Manufacturing Co., Ltd.	P.O. Box 316, Vancouver	Manufacturing leather gloves.
W. T. Glenn & Sons	Kelowna	Manufacturing leather goods.
Okanagan Saddlery	Vernon	" " "
A. J. Beer	West Summerland	" " "
B.C. Saddlery Co., Ltd.	Victoria	" " "
William Duncan	1322 Douglas St., Victoria	" " "
F. Norris & Sons	1320 Government St., Victoria	" " "
Wilcox-Hall Co., Ltd.	Kamloops	" " "
Sterling Glove Co.	Vancouver	Manufacturing leather gloves (suspended operations).
Searson & Russell	232 Cambie St., Vancouver	Making canvas gloves.
Vancouver Glove Co.	223 Carrall St., Vancouver	Manufacturing gloves.
Lawrence & Bishop	Mission City	Manufacturing leather goods.
S. Nelson & Co.	304 London Bldg., Vancouver	Tannery.
John Watson	127 Dufferin St. E., Vancouver	Manufacturing leather gloves.
Standard Shoe Manufacturing Co.	Vancouver	Manufacturing shoes.
J. Leckie Co., Ltd.	"	" "
Leckie Tannery	"	Tannery.

MANUFACTURE OF WOODEN TOYS.

Western Toy and Furniture Manufacturing Co.	Vancouver	Wooden toys.
Quinton A. Gosling	Murrayville	Wooden toys (suspended operations).
Hiker Manufacturing Co., Ltd.	Victoria	Wooden toys.
H. C. Derrick	Vancouver	Wooden toys (suspended operations).
Mrs. Emma G. Barnard	"	Wooden toys.
Dominion Composition Furniture & Toy Manufacturing Co., Ltd.	Victoria	Manufacturing toys.

Miscellaneous Wood-working Plants.

Firm.	Location.	Industry.
Kootenay Wire Works Co.	Nelson	Manufacturing wire mattresses and box-making.
A. Lundberg	Vancouver	Manufacturing artificial limbs.
Black Bros., Ltd.	"	Manufacturing auto tops and bodies.
E. C. Chrystall	"	Building construction.
Dominion Manufacturing, Ltd. (Vancouver Casket Co.)	"	Caskets and undertaking supplies.
Shaw Manufacturing Co., Ltd.	Central Park	Children's vehicles.
William J. Mable	Victoria	Manufacturing vehicles and repairs.
Marston Show Case Co.	Cedar Cottage	Show-cases.
Imperial Casket Co.	Vancouver	Caskets and undertaking supplies.
Twentieth Century House Co., Ltd.	"	Ready-cut houses (suspended operations).
J. S. Goddard	"	Auto tops and bodies.
Auto Body Builders	"	Manufacturing vehicles.
Canada Dolls, Ltd.	South Vancouver	Dolls and novelties.
Mill Cut Homes & Lumber, Ltd.	Vancouver	Cut-to-fit houses.
The Simmons, Ltd.	"	Iron beds, etc.
Vancouver Creosoting Co., Ltd.	"	Creosoting timber.
Cut-to-fit Buildings Co., Ltd.	"	Cut-to-fit houses.
S. M. Simpson	Kelowna	Wood-working plant.
John Brown	Vancouver	Carpenter-shop.
Pacific Coast Pipe Co., Ltd.	Vancouver	Manufacturing wood pipe.
Columbia Pulleys, Ltd.	"	Manufacturing wood pulleys.
Coast Box Co.	"	Wooden boxes.
Hardwood Lumber Co., Ltd.	"	Wood-working.
Terminal Construction & Manufacturing Co., Ltd.	"	"
Okanagan Building & Trading Co., Ltd.	Kelowna	Wood-working (suspended operations).
Dominion Woodwork Manufacturing Co.		Ditto.
Chalmers Cabinet Works, Ltd.	Vancouver	Wood-working.
Great West Manufacturing Co., Ltd.	"	"
C. A. C. Allen	Vernon	"
Canadian Pipe Co., Ltd.	550 Pacific St., Vancouver	Manufacturing wood pipes.
W. F. Drysdale	1033 North Park St., Victoria	Wood-working.
Williams, Trerise & Williams	853 Cormorant St., Victoria	"
Dalziel Box Co.	Victoria	Manufacturing wooden boxes.
Standard Box Co	Langley Prairie	Box-factory.
Johnson & Allan	148 Lorne St. E., Vancouver	Wood-working.
Canadian Box Co., Ltd.	101 Dufferin St., Vancouver	Manufacturing wooden boxes.
J. F. Stainton	Vernon	Wood-working.
Canadian Western Woodworkers	Victoria	"
Northwestern Box Co., Ltd.	607 Northwest Bldg., Vancouver	Box-factory.
San Juan Box Co., Ltd.	Port Renfrew	Manufacturing boxes.
Sunset Woodworkers	Vancouver	Wood-working.

Miscellaneous.

B.C. Anchor Fence Co., Ltd.	1031 Pender St. W., Vancouver	Manufacturing wire fences.
Canadian Northwest Steel Co., Ltd.	Front and Prince Edward St., Vancouver.	Fabrication and assembly steel.
Great Western Smelting & Refining Co.	146 Dufferin St. E., Vancouver	Manufacturing babbitt.
Morrison Steel & Wire Co.	Granville Island, Vancouver	Manufacturing wire nails.
Opsal Steel Co., Ltd.	Vancouver	Making steel and manufacturing tools.
Sea Island Can Co., Ltd.	597 Hastings St. W., Vancouver	Manufacturing cans.
Aetna Saw Works, Ltd.	Industrial Island, Vancouver	Manufacturing saws.
The Brittannia Wire Rope Co., Ltd.	Granville Island, Vancouver	Manufacturing wire rope.
Raemaekers & Stephen Bros.	Vancouver	Manufacturing agents.
The Lowox Steel Co., Ltd.	Foot of Smythe St., Vancouver	Steel.
Vancouver Rolling Mills Co., Ltd.	Eburne	Rolling-mills.
Atlas Steel Products, Ltd.	Industrial Island, Vancouver	Manufacturing steel products.
Pacific Copper & Brazing Co.	130 Dufferin St. W., Vancouver	Coppersmithing.
B.C. Silver & Nickel Plating Works	534 Howe St., Vancouver	Silverplating.
Cascade Plating Works	" "	Electroplating.
Roote's Auto Top Co.	740 Pacific St., Vancouver	Manufacturing auto-tops.
H. M. Nugent & Co.	48 Water St., Vancouver	Manufacturing tents and awnings.
Peerless Products, Ltd.	1150 Hamilton St., Vancouver	Manufacturing ink.
Victoria Tent Factory	618 Pandora St., Victoria	Manufacturing tents and sails.
Dominion Carton & Printing Works	Victoria	Manufacturing paper boxes.
Wm. N. O'Neil Co., Ltd.	"	Manufacturing art glass.
W. J. Pendray & Sons, Ltd.	"	Manufacturing soap.
Sidney Roofing & Paper Co., Ltd.	Victoria and Sidney	Manufacturing rubber roofing.
Victoria Mattress Works	Victoria	Manufacturing mattresses.
Gabriola Shale Products, Ltd.	Moody Block, Victoria	Manufacturing brick, with clay digging.
Pacific Coast Fluff Rug Co.	1069 Richards St., Vancouver	Manufacturing fluff rugs.
Canadian Bag Co., Ltd.	1152 Mainland St., Vancouver	Manufacturing jute bags.
Modern Macaroni Factory	638 Cormorant St., Victoria	Manufacturing macaroni.

MISCELLANEOUS—*Continued.*

Firm.	Location.	Industry.
Pacific Roofing Co., Ltd.	Industrial Island, Vancouver	Manufacturing roofing-paper.
A. J. Cassels & Co.	508 Richards St., Vancouver	Manufacturing window-shades.
Nakamura Bros.	174 Dufferin St. W., Vancouver	Noodle-factory.
Western Tire & Rubber Co.	c/o Carter & Bird (assignee), 626 Pender St. W., Vancouver.	Manufacturing rubber goods.
B.C. Laboratories, Ltd.	Pender St. W., Vancouver	Manufacturing soap products.
The Canadian Refiners, Ltd.	415 Bank of Nova Scotia Bldg., Vancouver.	Refining of Epsom salts.
The Vancouver Island Riggers' & Sail-makers' Association, Ltd.	1304 Wharf St., Victoria	Sail-makers.
Canada Western Woollen Mills, Ltd.	Vancouver	Woollen-mill.
North America Noodle Factory	433 Georgia St. E., Vancouver	Noodle-factory.
B.C. Vinegar Works, Ltd.	Vancouver	Manufacturing of vinegar.
B.C. Sugar Refinery Co., Ltd.	"	Manufacturing of sugar.
B.C. Pharmical Co., Ltd.	"	Manufacturing of drugs.
Davis Paper Box Co., Ltd.	1668 Pandora St., Vancouver	Manufacturing paper boxes.
National Paper Box & Carton Co., Ltd.	160 Lorne St. W., Vancouver	" "
Edward Lipsett	68 Water St., Vancouver	Manufacturing tents and awnings.
The Barrett Co., Ltd.	Tenth and Arbutus St., Vancouver	Manufacturing roofing.
Royal Crown Soaps Co., Ltd.	Vancouver	Manufacturing soap and paper boxes.
C. H. Jones & Son, Ltd.	28–30 Water St., Vancouver	Manufacturing tents and awnings.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

FIFTEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit for your consideration herewith the Annual Report of the Department of Agriculture for the year 1920.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., March 31st, 1921.

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BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

BRANCHES AND CHIEF STAFF MEMBERS, YEAR 1920.

Minister of Agriculture:

Hon. E. D. Barrow, M.P.P.

Deputy Minister:

Dr. D. Warnock, F.R.C.V.S., O.B.E.

Departmental Secretary:

Wm. J. Bonavia.

Statistician:

G. H. Stewart.

Horticultural Branch:

W. T. Hunter, B.S.A., District Horticulturist and Inspector of Fruit Pests (Vernon).
E. W. White, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Victoria).
W. H. Robertson, B.S.A., Assistant Horticulturist and Inspector of Fruit Pests (Victoria).
E. C. Hunt, B.Sc., Assistant Horticulturist and Inspector of Fruit Pests (Nelson).
H. H. Evans, District Field Inspector (Vernon).
C. R. Barlow, District Field Inspector (Salmon Arm).
T. M. Anderson, District Field Inspector (Kelowna).
J. Tait, District Field Inspector (Summerland).
A. J. Mann, District Field Inspector (Penticton).
R. A. Newman, District Field Inspector (Vernon).
Paul C. Black, District Agriculturist and Field Inspector (Grand Forks).
C. B. Twigg, B.S.A., District Agriculturist and Field Inspector (Creston).
G. L. Foulkes, Secretary.

Imported Fruit and Nursery Stock Inspection Branch:

W. H. Lyne, Chief Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancouver).
D. Gavet, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancouver).
W. J. Graham, Assistant Inspector of Imported Fruit and Nursery Stock, Rice, etc. (Vancr.).
H. F. Olds, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc. (Vancouver).
M. L. Bird, Assistant Inspector of Imported Fruit, Vegetables, Rice, etc. (Vancouver).

Plant Pathology and Entomology Branch:

J. W. Eastham B.Sc., Plant Pathologist (Vancouver).
M. H. Ruhmann, Assistant Entomologist (Vernon).
E. R. Buckell, Field Assistant (Vernon).

Markets Branch:

*R. C. Abbott, Coast Markets Commissioner and Inspector in Charge of Exports (Vancouver).
J. A. Grant, Prairie Fruit Markets Commissioner (Calgary).
H. Gutteridge, Assistant Potato Inspector (Vancouver).
A. Irving, Assistant Potato Inspector (Vancouver).

Live Stock Branch:

W. T. McDonald, M.S.A., Live Stock Commissioner (Victoria).
J. R. Terry, Chief Instructor in Poultry-raising (Victoria).
W. Newton, B.S.A., M.S., Chief Soil and Crop Instructor (Victoria).
C. Tice, B.S.A., Soil and Crop Instructor (Victoria).
G. C. Hay, B.S.A., District Agriculturist (Kamloops).
Dr. A. Knight, V.S., Chief Veterinary Inspector (Victoria).
Dr. S. A. K. White, B.S., Assistant Veterinary Inspector.

Live Stock Branch—Continued.

Dr. W. W. ALTON, V.S., Assistant Veterinary Inspector.
Dr. B. R. ILSLEY, V.S., Assistant Veterinary Inspector.
Dr. W. T. BROOKES, Assistant Veterinary Inspector.
Dr. M. SPARROW, Assistant Veterinary Inspector.
Dr. J. D. MCDONALD, Assistant Veterinary Inspector.
R. J. FERRIS, Silo Demonstrator.
W. H. STROYAN, Poultry Caretaker.
GEO. PILMER, Brand Recorder.
R. CAHILTY, Brand Inspector.
*J. W. MCKINLEY, Foreman, 105-Mile Experimental Station.
C. PHELPS, Foreman, Quilchena Experimental Station.

Dairy Branch:

H. RIVE, B.S.A., Commissioner.
*T. A. F. WIANCKO, Dairy Instructor and Inspector.
C. RIVE, Milk-tester (Kelowna).
J. B. WATSON, Milk-tester (Sardis).
G. H. THORNBERRY, Cow-tester.
W. EGERTON, Cow-tester (Langley Prairie).
J. A. MUNN, Cow-tester (Chilliwack).
T. A. MENZIES, Cow-tester (Sandwick).
C. G. NEWLANDS, Cow-tester (Vancouver).
M. VALENTINE, Butter-maker (Vanderhoof).
E. YOUNG, Butter-maker (Kamloops).

Foul-brood Inspectors:

W. J. SHEPPARD, Chief Inspector (Nelson).
F. D. TODD (Victoria).
W. H. TURNBULL (Lower Mainland).
A. W. FINLAY (Lower Mainland).
A. KEIR (Lower Mainland).
H. L. CHITTENDEN (Bradner).

Publications Branch:

R. J. FERRIS, Editor.

Household Science Branch:

*Miss OLIVE HAYES, Provincial Instructor and Demonstrator.

General:

A. H. SHOTBOLT, General Assistant.
D. E. MACKERETH, Carpenter.

Accountant's Branch:

W. T. ANDREWS, Chief Accountant.
R. E. MITCHELL, Assistant Accountant.
C. P. L. PEARSON, Assistant Accountant.

Clerical:

F. H. DAVEY.
R. MURRAY.
A. J. HOURSTON.
D. JOHNSON.
*E. A. BOXALL.
E. DRUMMOND.
V. J. F. BABINGTON.
E. CLARKE.
A. E. HILL.
N. EVANS.
F. L. BROOKS.
*G. HAWES.
*M. G. BURNYEAT.
G. LINDSAY.
V. M. BRAKES.
*M. LAUDER.
A. P. WOODWARD.
K. MCRAE.
M. WALSH.
L. LEES.
*F. M. LAWSON.

Women's Institutes:

Mrs. V. S. MACLACHLAN, Secretary.

* Resigned during the year.

REPORT OF DEPARTMENT OF AGRICULTURE.

REPORT OF THE DEPUTY MINISTER OF AGRICULTURE.

D. Warnock, F.R.C.V.S., O.B.E.

Hon. E. D. Barrow,
Minister of Agriculture, Victoria, B.C.

Sir.—I have the honour to submit herewith the report of the Department of Agriculture for the year 1920:—

Agricultural production for the past year is shown in value as $68,004,953, against $65,384,556 for the year 1919, being an increase of $2,620,397. Imports of similar commodities from other Provinces in Canada are valued at $18,902,981 and from foreign points $7,913,488, showing an increase in imports of $3,911,942 over the previous year.

Live-stock statistics show $14,014,873 as the value of all domestic animals coming under this heading. These figures indicate an increase of $1,577,363. Meats of all kind show an increase in production of 3,482,000 lb., representing an increase in beef and veal of 3,400,000 lb. and in mutton of 138,000 lb., from the aggregate of which is deducted a decrease in pork and pork products of 56,000 lb.; total production of meats for the year being valued at $4,217,212, an increase of $486,412 over 1919. Poultry and eggs produced during the year are given as indicating an increase in value of $316,899, of which dressed poultry represents $194,850 and eggs $122,049. Dairy products of $6,966,757 in comparison with $6,804,364 for 1919 give an increase of $162,393, whilst the quantity of fresh milk consumed was 8,908,310 gallons, being a decrease of 562,067 gallons from the amount consumed in 1919. There was an increase of 233,025 lb. in butter produced, which is shown as 2,551,315 lb. In cheese also there was an increase of 37,551 lb., representing a production of 342,053 lb.

Fruit production of 79,549,743 lb. during 1920 fell short of the previous year by 63,142,657 lb., with a consequent decrease in value of $2,820,750, or shrinkage of 44 per cent., the total fruit-crop being estimated at $4,951,750. The output of apples is estimated at $2,796,215, being only 53 per cent. of the year 1919. Small fruits estimated at 4,311,152 lb., of a value of $951,075, show a decrease of 3,549,348 lb. and a shrinkage in value of $519,995, representing only 61 per cent. of the crop of the previous year.

The total vegetable-crop of 213,481 tons exceeds that of 1919 by 11,470 tons, and is valued at $8,898,819, being an increase of $1,487,624. Fodder-crops aggregating 565,537 tons, representing a value of $17,410,852, show an increase in tonnage of 40,135 tons; whilst grain-crops of 3,366,675 bushels indicate a decrease of 487,324 bushels and a shrinkage in value of $1,001,954. Among the miscellaneous crops hops show an increase from 337,440 lb. to 862,755 lb., valued at $405,494, being an increase of over 100 per cent. in both quantity and value.

An analysis of the potato situation discloses the fact that of the 1920 crop 85 cars were inspected for export to Prairie points and 185 cars were inspected for the Vancouver market. Besides those inspected, 107 cars of British Columbia potatoes went into home consumption, making a total of 292 cars accounted for on the local market.

During the first half of the year 330 cars of the 1919 crop were exported to the United States and 1,686½ tons to the Prairies and Eastern Canada, making total exportations to the other Provinces during 1920 aggregate 162 cars.

The relative statement of potatoes exported to the United States and those imported from that country during 1920 shows that during the first six months of the year 9,886 tons, valued at $790,880, were exported, and during the last six months 9,626 tons, valued at $433,170, were imported.

Live Stock.

The Live Stock Commissioner reports an improvement in the character of the stock kept in the Province, both in dairy and beef herds. This is attributed to the increasing desire on the part of breeders to use pure-bred sires. The Hereford and Shorthorn breeders have each formed a Provincial association in the Interior, where a number of pure-bred beef cattle herds are being established.

The dairy cattle industry is in a very healthy condition. An additional number of Jersey herds are being established on Vancouver Island, and in June last the Jersey-breeders' Association held its annual meeting in Duncan, which is becoming an important Jersey-breeding centre. The Holstein-breeders held their annual sale at New Westminster on December 10th, when a fine lot of animals were sold at auction.

Hog-raising has not received the attention from farmers formerly given to it, and the tendency to reduce or disperse herds has been largely due to the cost of grain and mill-feeds. An outbreak of hog-cholera in the Okanagan Valley was reported during the months of October and November, but it has been brought under control, and it is hoped that there will be no further losses.

Sheep-raising has suffered some reverses owing to the condition of the wool market, but there has been apparently no reduction in the number of sheep kept in the Province.

VETERINARY INSPECTION AND HEALTH OF ANIMALS.

Tuberculin-testing of cattle has been carried on during the past year with satisfactory results, and several portions of the Province are apparently free from the disease, notably the Okanagan Valley and the Gulf Islands. A few cases were found in the Columbia Valley where cattle had been imported from outside of the Province. The Veterinary staff visited 2,409 premises, testing 17,071 head of cattle, of which 732 were reactors. The sanitary conditions of dairies and barns is also reported as showing an improvement.

DAIRY BRANCH.

The Dairy Commissioner reports new creameries established at Vanderhoof and Quesnel under the supervision of his branch of the service. In the older-settled districts educational butter-grading has been introduced, but owing to the fact that only a very small part of the butter manufactured within the Province finds its way into the wholesale markets the necessity for standardizing and checking up according to quality is less evident to the creamery-men of British Columbia, who dispose of their output through local sales, than if they were exporting butter in competition with other dairy countries. The British Columbia Dairymen's Association introduced a very successful phase into its convention at Vancouver in January, 1920, by a display of milk values in comparison with other foods. This was of great educational value and created an interest in hygienic feeding of infants and children. Cow-testing work under the direction of the Dairy Branch has been producing very satisfactory results in ridding dairy herds of unprofitable animals and in disseminating knowledge as to scientific feeding.

SILOS.

Silo-demonstration work, which is closely identified with dairying, has been carried on in East Kootenay, along the line of the Grand Trunk Pacific Railway, and in the Keremeos District. In addition to the demonstrations, working plans have been sent out by the Department for the construction of a great many silos in different parts of the Province. For the construction of cement silos forms have been purchased and loaned to farmers desirous of erecting such structures.

POULTRY.

The Poultry Division of the Department has instituted an innovation at the Egg-laying Contest by installing single pens and flocks to determine the relative merits of the two systems and their effect upon egg production. The birds have been entered in the Dominion Record of Performance, which requires a hen to lay 150 eggs in the twelve months of the test to qualify for registration. During the Ninth Contest, which closed October 5th, 1920, the best laying bird produced 243 eggs, whilst in the heavy class the highest record was 228. Owing to the cold wet spring serious outbreaks of coccidiosis were reported and investigated. A large proportion of day-old chicks imported into the Province died from the ravages of this disease, and it is the opinion of the Poultry Experts that adequate supervision and inspection of day-old chicks shipped in from outside the Province will be required if such outbreaks are to be checked.

The enforcement of the "Eggs Marks Act" is stated to have prevented Chinese eggs from being sold in the Province. Greater efficiency might be experienced in other respects if the co-operation of police and health officers were granted.

Soil and Crop Division.

The work of the Soil and Crop Division has been considerably extended during 1920 and soil investigations have been carried on in different parts of the Province. Through an arrangement with the Department of Mines, chemical analyses of soil have been conducted to supplement the physical analyses made by the Soil Expert of the Department of Agriculture, who examines the field conditions whenever possible so that he may recommened remedial soil-management methods.

A publication entitled "The Potato in British Columbia" has just been issued to the public, as also a circular entitled "British Columbia Potato-seed Certification and Inspection."

Horticulture.

The Horticultural Branch has been conducting educational work in orchard-cultivation, packing and pruning schools, and pest-control. Orchard surveys have been made in each of the four districts into which the Province has been divided for horticultural purposes, and as a result of these investigations much valuable information has been secured, including data as to the amount of land held by Orientals for agricultural purposes.

Operations on the experimental plots at Gordon Head were carried on for extermination of strawberry-weevil. After the crop was harvested 8-week-old cockerels were liberated on one of the plots and did good work in picking up migrating adult weevils.

Codling-moth control for several years has been carried on in the Okanagan Valley, but during 1920 a system of control had to be inaugurated at North Bend, where an outbreak was noticed during the season of 1919. At Kelowna, where the pest was supposed to have been eradicated several years ago, a fresh outbreak was detected late in October on an area of about 20 acres within the city limits. Strict quarantine regulations will be enforced during 1921. Other points receiving attention to avoid carrying infestation from one year to the other include Westbank, Okanagan Landing, Swan Lake, Vernon, and Walhachin. To prevent introduction of the codling-moth from foreign points, inspection of foreign refrigerator-cars was carried out at Okanagan Landing and at Keremeos.

Apiaries.

The work of the Apiaries Branch has proved very difficult owing to the prevalence of foul-brood on the Lower Mainland, the rest of the Province being practically free of the disease. The honey-crop was 60 tons short of that reported in 1919 and shows a decrease in value of $35,673, which is largely accounted for in the losses sustained in the infected area. Experimental work will be carried on to find a means to combat this difficulty.

Import and Export Inspection.

Consequent upon the resignation of the former Coast Markets Commissioner, the inspection-work carried on under that branch of the service was transferred to the supervision of the Inspector of Imported Fruit and Nursery Stock, whose branch inspected the 1920 crop exportations of potatoes, consisting of 85 cars to Prairie points and shipments of 185 cars for the Vancouver market.

This branch also took the supervision of inspection at Vancouver under the provisions of the "Eggs Marks Act." The officials found that United States eggs were not being handled through the retail establishments, but that an outlet was found for them through restaurants, hotels, and outside camps, where markings are not necessary for United States products as in the case of Chinese eggs. Large reshipments are also reported as being made to Prairie markets.

The inspection of imported fruit and nursery stock is carried on at twenty-six ports of entry, giving an effective service against infestation from imports. The Plant Pathologist opines that owing to the excessive rainfall during September and October there has been a great influence in bringing about disease and conditions approaching disease, and much infestation has probably occurred, the effects of which will not be visible until spring.

Tuber-diseases are reported as causing considerable loss to potato-growers in the Fraser Valley, either rotting the crop in the ground or rendering it liable to loss in storage as a result of infection from the soil.

PRAIRIE MARKETS.

The Prairie Markets Commissioner reports losses on fruit in transit as being proportionately less during 1920 than at any other time in the history of British Columbia shipping. This is accounted for largely as due to the improved facilities and refrigerator-cars furnished by the Dominion Express and also to the comparative absence of disease in the fruit shipped. There is also stated to be noticeable improvement in packing, which was commented on favourably by the fruit trade.

STATISTICS BRANCH.

The Statistics Branch during the year supplemented its work of gathering statistics by designing a "Farm Account Book" which was printed early in the year and has been issued to those making application.

FARMERS' INSTITUTES.

At the close of 1920 the number of Farmers' Institutes was 129, with a paid-up membership of 5,720, being a decrease of 570 from the previous year. This has been accounted for as resulting from the organizing activities of the United Farmers of British Columbia, with whom conferences have been held on the subject of amalgamation. This step does not appear to meet with the approval of the majority of institutes, which have decided for another year to continue their work as previously.

Sales of stumping-powder for land-clearing purposes, through Farmers' Institutes, show an increase of 56 per cent. and amount to 11,507 cases, as against 7,356 for the year 1919.

WOMEN'S INSTITUTES.

Women's Institutes membership was 2,758 at the close of 1920, representing seventy-two Institutes, of which five were new organizations. Through co-ordinating the work of the Departments of Education and Agriculture, continuation classes have been organized in such subjects as dressmaking and millinery.

In child-welfare work and public health the institutes have taken an important part and are co-operating with the Board of Health in improving conditions of living in the rural districts.

FALL FAIRS.

Fall fairs were held during the season at fifty-seven different points, and grants were made in aid on a basis of 50 per cent. of the amount paid by the associations the previous year for prizes for agricultural exhibits. In addition to such assistance, the Department supplied judges, varying in number for the respective shows from one to sixteen and averaging three for each. In this work the co-operation of the University of British Columbia is acknowledged with thanks for supplying five judges to assist at the three big Coast fairs.

AGRICULTURAL JOURNAL.

The policy of the Department in publishing a monthly journal for the dissemination of information and the encouragement of co-operative movements among farmers' organizations has been continued, and the circulation of the *Agricultural Journal* has grown to 9,500 copies monthly.

Appended hereto are the reports of branches and staff officials outlining in detail their respective activities.

Respectfully submitted.

D. WARNOCK,
Deputy Minister of Agriculture.

REPORT OF SECRETARY FOR THE DEPARTMENT OF AGRICULTURE.

WM. J. BONAVIA.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report as Secretary of the Department for the year 1920.

STAFF.

The Estimates for the fiscal year ending March 31st, 1921, provided for a staff of seventy-seven members of all ranks, as against fifty-two in 1919. Several technical appointments, however, were not filled.

Sixteen appointments were made to the staff, as per attached table, five of these being occasioned by the transfer of horticulturists and field officers who had hitherto been carried on the "Agricultural Instruction Act."

STAFF APPOINTMENTS, 1920.

Date.	Name.	Appointment.	Remarks.
1920.	*General Office.*		
April 1	Miss F. Brooks	Stenographer.	
	Horticultural Branch.		
April 1	T. M. Anderson	Assistant District Field Inspector (Kelowna)	
„ 1	R. A. Newman	District Field Inspector (Vernon)	
„ 1	W. T. Hunter	District Horticulturist (Vernon)	Promoted from Penticton.
„ 1	E. C. Hunt	District Horticulturist (Nelson).	Transferred from "Agricultural Instruction Act."
„ 1	C. B. Twigg	District Field Inspector and Agriculturist (Creston)	Ditto.
„ 7	A. J. Mann	District Field Inspector (Penticton)	
May 1	Miss M. Hicks	Stenographer (Vancouver).	
June 1	V. Tonks	Clerk and Stenographer (Vernon)	
July 1	Paul C. Black	District Field Inspector and Agriculturist (Grand Forks).	
	Live Stock Branch.		
Mar. 24	Cecil Tice	Soil and Crop Instructor.	
April 1	Geo. C. Hay	District Agriculturist (Kamloops)	Transferred from "Agricultural Instruction Act."
„ 1	Miss M. Lauder	Stenographer (Kamloops)	Ditto.
June 1	Wm. Newton	Chief Soil and Crop Instructor ..	Reappointed after leave of absence.
	Markets Branch.		
April 1	Arthur Irving	Assistant to Commissioner (Vancouver).	
Nov. 8	Miss L. O. Graham	Stenographer (Vancouver).	

RESIGNATIONS.

The year was marked by an unusual number of resignations from the staff, there being a total of ten, as against six the previous year.

Date.	Name.	Appointment.	Remarks.
1920.			
Mar. 23	Miss V. J. F. Babington	Stenographer	Private business.
„ 31	H. E. Upton	District Poultry Instructor	To Soldier Settlement Bd.
„ 31	T. A. F. Wiancko	Assistant Dairy Instructor	Private business.
April 30	Miss G. Hawes	Clerk and Stenographer (Vancr.)	„
„ 30	Miss O. Hayes	Domestic Science Instructor	To Soldier Settlement Bd.
June 1	J. J. Mouat	Clerk (Vernon)	Transferred.
Aug. 30	R. C. Abbott	Coast Markets Commissioner	Private business.
Oct. 13	Miss F. Lawson	Clerk and Stenographer (Vancr.)	„
„ 30	D. Johnson	Clerk	„
1921.			
Jan. 31	Ben Hoy	District Horticulturist	„

TEMPORARY APPOINTMENTS.

There were seven temporary officials appointed under Provincial votes and nineteen under the various sections of the "Agricultural Instruction Act," as follows:—

Provincial Votes.—General Office, 1 Accountant, 2 Stenographers, and 1 Carpenter; Horticultural Branch, 1 District Field Inspector; Live Stock Branch, 1 Clerk; Plant Pathologist, 1 Assistant.

Occasional services were also rendered by: 1 Brand Inspector; 24 Customs Officers acting as Fruit Inspectors; 5 Inspectors of Nursery Stock (Vancouver) and Packers; 47 Judges, Fall Fairs.

"*Agricultural Instruction Act.*"—Under this Act the following appointments were made: 6 Inspectors of Apiaries; 1 Foreman, Quilchena Dry Farm; 1 Poultryman, Egg-laying Contest; 3 Supervisors, Cow-testing Associations; 2 Testers, Cow-testing Associations; 2 Assistant Entomologists (Vernon); 1 Stenographer; 1 Messenger; 2 Butter-makers.

CORRESPONDENCE.

The press of business that has been evident in the Department during the year is fully borne out by the increase in the totals of letters received and dispatched, as follows:—

Letters received: 1920, 28,050; 1919, 23,898; increase, 4,152, or 17 per cent.

Letters dispatched: 1920, 29,652; 1919, 23,648; increase, 6,034, or 25.5 per cent.

So far as this office is concerned, 11,632 letters were received and 8,318 dispatched, showing an appreciable increase over 1919. The total letters, in and out, handled by this office now reach the high proportion of 34.5 per cent. of the total correspondence of the Department at headquarters. (Appendix No. 1 shows the full details.)

Circular Letters.—The total number of stencilled circular letters sent out was 37,667, being somewhat less than in 1919, when a 50-per-cent. increase was recorded.

For convenience the letters have been grouped as follows:—

Agricultural Associations	220
Dairy Division	5,119
Farmers' Institutes	5,725
Goat-breeders' Association	6,050
Horticultural Branch	790
Miscellaneous	4,807
Poultry Branch	5,700
Stock-breeders' Association	1,380
Statistics Branch	3,460
Soil and Crop Division	805
Women's Institutes	3,611
Total	37,667

Publications.

During the year the writer prepared for publication Bulletin No. 26 on the Columbia-Kootenay Valley and a booklet on the Co-operative Farmers' Institutes of British Columbia; considerable time was also given to the revision and reissue of various bulletins and circulars and to the Annual Report of the Department.

The following statement shows the total number of bulletins, circulars, etc., printed and issued by the Department during 1920:—

Date.	Name.	Description.	No.
1920.	*Bulletins.*		
Mar. 11	Management of Market Rabbits	Bulletin No. 80 (2nd Ed.)	5,000
„ 18	Market Poultry	Bulletin No. 49 (4th Ed.)	10,000
„ 18	Breeding and Selection of Commercial Poultry	Bulletin No. 74 (2nd Ed.)	7,500
Feb. 17	Climate of British Columbia	Bulletin No. 27 (5th Ed.)	5,000
May 5	Agricultural Statistics for 1919	Bulletin No. 84	12,000
„ 11	The Columbia-Kootenay Valley	Bulletin No. 26 (2nd Ed.)	3,500
Oct. 25	Clearing Bush Lands in British Columbia	Bulletin No. 85	2,500
Nov. 9	Poultry-house Construction	Bulletin No. 63 (3rd Ed.)	10,000
Dec. 9	The Potato in British Columbia	Bulletin No. 86	10,000
	Circular Bulletins.		54,700
Jan. 5	Strawberry-root Weevil	Circ. Bull. No. 33 (Revised)	2,000
„ 31	Hints on Egg-hatching	Circ. Bull. No. 25	10,000
Feb. 26	Cottage Cheese Dishes	Circ. Bull. No. 26	2,000
April 1	Soil-contamination	Circ. Bull. No. 26	2,500
Aug. 3	Poultry Culling	Circ. Bull. No. 24	2,000
Nov. 3	Care of Milk and Cream	Circ. Bull. No. 10 (2nd Ed.)	2,000
„ 9	Management of Geese	Circ. Bull. No. 12 (2nd Ed.)	5,000
„ 9	Soil-contamination	Circ. Bull. No. 26 (2nd Ed.)	5,000
	Horticultural Circulars.		30,500
Jan. 5	Raspberry Culture	Hort. Circ. No. 55	10,000
„ 26	Pruning Tree-fruits	Hort. Circ. No. 60	10,000
„ 29	Spray Calendar, 1920	Poster	5,000
April 7	Making Lime-sulphur at Home	Hort. Circ. No. 61	2,500
Dec. 7	Codling-moth Control	Poster	1,000
„ 16	Making Lime-sulphur at Home	Hort. Circ. No. 61 (2nd Ed.)	1,000
„ 20	Currant and Gooseberry Culture	Hort. Circ. No. 56	1,000
	Agricultural Department Circulars.		30,500
Jan. 9	Food for Young Children	Nos. 24, 25, and 26	2,000
Nov. 3	Community Breeding	No. 14 (3rd Ed.)	750
	Miscellaneous.		2,750
Jan. 15	*Re* Milk Diet	Leaflet	80,000
Feb. 12	A Bee-keeper's Calendar	Poster	2,500
„ 15	Co-operative Farmers' Institutes of British Columbia	Leaflet	2,500
Mar. 29	Cream Grading	„	4,000
April 6	Farm Account Book	Book	1,000
„ 26	Food Leaflets for Women's Institutes	Leaflet	1,000
May 6	Some Questions and Answers *re* British Columbia	„	2,000
„ 27	High Cost of Bacteria	„	1,000
June 1	Regulations *re* "Creameries and Dairies Act"	„	250
July 17	A Bee-keeper's Calendar (2nd Ed.)	„	500
„ 20	Constitution and By-laws of United Farmers	„	250
Sept. 14	How to organize a Public Health Committee	„	1,000
Nov. 9	Regulations for Women's Institutes	„	2,500
	Reports.		98,500
April 26	British Columbia Entomological Society	Bull. No. 11 (Economic)	600
June 7	Department of Agriculture, Year 1919	Fourteenth Annual Report	1,000
			1,600

PUBLICATIONS—*Continued.*

Date.	Name.	Description.	No.
	Agricultural Journal.		
Jan. 5	Agricultural Journal	January issue	8,500
Feb. 9	„	February issue	8,500
„ 19	„	March issue	8,500
Mar. 29	„	April issue	9,300
April 29	„	May issue	9,600
June 7	„	June issue	9,000
July 2	„	July issue	9,000
„ 29	„	August issue	9,300
Sept. 9	„	September issue	9,500
Oct. 11	„	October issue	9,500
Nov. 3	„	November issue	9,500
„ 30	„	December issue	9,500
			109,700
	Grand total		328,250

Bulletins and Circulars mailed or otherwise distributed during 1920.—The grand total of all publications issued as above was 141,823, being a slight reduction on the record figure established the previous year.

FINANCIAL.

The appropriations for the Department for the fiscal year ending March 31st, 1921, totalled $342,736, as against $291,035 for the previous period.

Special warrants to extend certain votes were authorized during the year to the sum of $10,947.75, including:—

Agricultural Fairs	$3,000
Coast Markets Commissioner	500
Women's Institutes	3,500
Inspection of imported fruit, etc.	3,500

(*See* Appendix No. 2.)

The gross receipts of the Department for the calendar year amounted to $142,178.46 and the revenue to $36,407.11, as against $116,471.97 and $41,419.85 in 1919.

Seed-grain Refunds.—Refunds on account of notes given for seed supplied in the years 1915, 1917, and 1918 were very limited during the past year, as will be seen.

Refunds, 1915 account	$ 138 75
„ 1917 „	181 20
„ 1918 „	1,062 95
Total	$1,382 90

The outstanding notes at the close of 1920 were as follows:—

1915 account	$ 5,233 72
1917 „	2,810 09
1918 „	9,256 20
Total	$17,300 01

Receipts from sales of the stock of wheat stored at Fort Fraser (1918 account) amounted to $415 during the year.

All Government Agents who had been connected with distributions of seed-grain in different years were written to so as to obtain their views on the best methods of enforcing payment, and some interesting suggestions were received.

"*Agricultural Instruction Act.*"—The following payments and refunds were received under the provisions of the Act during 1920: $31,687.45, one payment being overdue from Ottawa at the close of the year. The total expenditures during same period were $62,992.88.

Junior Holstein herds at Vancouver Exhibition, year 1920.

The Bulkley River and Valley, near Smithers.

Nechako Valley native grasses make good feed for cattle.

British Columbia Students.

During 1920 only two new British Columbia students established their claim to the grant paid by this Department, it being understood that, in view of the facilities now available at the University in Vancouver, these grants would be no longer available as soon as the present students had graduated.

The following students were in receipt of grants during 1920–21:—

Ontario Agricultural College.—Home Economics Course: Miss Mary L. Grant, Vancouver; Miss Gundrid M. Rebbeck, Vancouver; Miss C. E. Maxwell, New Westminster; Miss Bessie S. Dickinson, Duncan. Agricultural Course: Andrew Fulton,* Lumby; H. R. L. Davis,* Milner; J. C. Roger,* Summerland; Geo. Knowles,* Langley Prairie.

Manitoba Agricultural College.—Home Economics Course: Miss G. Hallwright, Victoria.

University of Toronto.—Home Economics Course: Miss K. Drew, New Westminster; Miss B. Beddie; Miss Lilian E. King, Prince Rupert.

Farmers' Institutes.

The year 1920 has proved to be a period of unrest and indecision for many of the institutes owing to the subject of amalgamation or not with the United Farmers of British Columbia having been a constant theme at meetings.

Following the conventions of "Farmers' Week" held in the Capital City during February, at which a resolution was passed by joint delegates from Farmers' Institutes and United Farmers favouring amalgamation of the two bodies, it was expected that the committee appointed to deal with the issue would have been able to put forward concrete plans to bring about the desired union. However, the year has passed without any further advance, and from reports received and general indications it would appear as if the majority of institutes will prefer to retain their link with the Department.

The organizing activities of the United Farmers have had an undoubted effect in many rural districts and quite a number of institutes have ceased to function.

(*a.*) *Officially closed down and Charter cancelled.*—Fort Steele Farmers' Institute, Ladysmith Farmers' Institute, Lake District Farmers' Institute, Penticton Farmers' Institute, Salmon Valley Farmers' Institute, Slocan Valley Farmers' Institute, and Sumas Farmers' Institute; total, 7.

(*b.*) *Temporarily closed down, Charter not cancelled yet.*—Burton City Farmers' Institute, Eagle Bay Farmers' Institute, Fort George Farmers' Institute, Greenwood Farmers' Institute, Hardy Bay Farmers' Institute, Hendon Farmers' Institute, Houston Farmers' Institute, Jaffray Farmers' Institute, Kispiox Farmers' Institute, Nass Valley Farmers' Institute, Pend d'Oreille Farmers' Institute, Refuge Bay Farmers' Institute, Roe Lake Farmers' Institute, Seymour Arm Farmers' Institute, Silver Creek Farmers' Institute, Spiller River Farmers' Institute, Ucluelet Farmers' Institute, Wheeler Mountain Farmers' Institute, and Welcome Harbour Farmers' Institute; total, 19.

It is only fair, however, to point out that the majority of institutes in section (*b*) include many that struggled through the difficult period of the war and have not been able to revive their membership from various causes.

New Incorporations.—The following new institutes were incorporated during the year: Deroche Farmers' Institute, Gray Creek Farmers' Institute, Magna Bay Farmers' Institute, Mud River and Beaverley Farmers' Institute, Whaletown Farmers' Institute, and Whonnock and District Farmers' Institute; total, 6.

The net number of Farmers' Institutes, allowing for above changes, was 130, with a paid-up membership of 5,720, as against a membership of 6,290 in 1919.

The Farmers' Institutes with the largest number of members were as follows:—

Delta	188
Victoria	170
Islands	150
Shirley and District	148
Cowichan	142
Spallumcheen	142
Aldergrove	128

* Returned from overseas to complete course.

Howe Sound 120
Coquitlam 104
Nechako 104

Stumping-powder.—The price of stumping-powder has remained stationary throughout the year at $7.67½ per case. Considerable activity in land-clearing is indicated by an increase of 56 per cent. in the amount of powder supplied by the Department to institutes for cash or on consignment terms; the total number of cases being 11,507, as against 7,356 in 1919.

In view of the Government's declared intention of reducing the cost of stumping-powder to the agriculturist by means of a rebate or bonus, the following tables may be of interest:—

Year.	Supplied by Canadian Explosives, Ltd.	Supplied by Giant Powder Co. of Canada.	Total.	Minimum and Maximum Prices.
	Cases.	Cases.	Cases.	Cases.
1914	11,500	2,698	14,198	$5.00
1915	13,324	1,730	15,054	5.60–$6.50
1916	3,000	998	3,998	6.50– 7.25
1917	3,000	1,460	4,460	7.25– 9.75
1918	2,400	1,109	3,509	9.75–10.25
1919	4,555	2,801	7,356	9.75– 8.17½
1920	5,314	6,193	11,507	7.67½

Stumping-powder, Year 1920.

Powder supplied to Members of Farmers' Institutes.		Cost of Powder bought by Agricultural Department.	Payments received, Year ending Dec. 31st, 1920.	Indebtedness of Farmers' Institutes to Agricultural Department, Dec. 31st, 1920.
Giant Powder Co.	Canadian Explosives, Ltd.			
Cases for cash ..... 1,838 Cases on consignment, 4,355	Cases for cash ..... 3,131 Cases on consignment, 2,183			
Total 6,193	Total 5,314	$91,644.91	$80,033.00	$17,914.37
Value $47,559.69	Value $41,879.97			

Advisory Board.—Meetings of this Board were held as follows: Victoria, February 23rd and 24th; Kelowna, June 4th. The only change in the personnel of the Board was the nomination of J. H. Brearley, Cedar Vale, representing District B, in place of M. F. Nourse.

Fairs held by Farmers' Institutes.—The following fairs were organized by institutes: Denman Island, September 27th; Ioco, September 4th; Whonnock, September 17th; Howe Sound, September 25th; Forest Grove, October 1st. Judges were sent by the Department to the first four places.

The "Societies Act, 1920."—By the passing of this Act Farmers' Institutes (and similar non-share-capital associations) were removed from the provisions of the "Agricultural Act" of 1915 as regards incorporation, etc., and automatically brought under the new Act. New by-laws and regulations in conformance with the "Societies Act" have been prepared and will be issued shortly.

Financial.—The vote for Farmers' Institutes for the fiscal year 1920–21 was $9,000, whilst during the year 1920 there was expended the sum of $4,350.56 from the vote of the previous fiscal year.

Women's Institutes.

As in the case of Farmers' Institutes, all existing Women's Institutes have been brought under the provisions of the "Societies Act, 1920." By-laws and regulations (dated November 2nd, 1920) based on the Act have been prepared and issued.

The year closed with a total of seventy-two institutes organized, with several applications carried over to the new year.

Five new institutes received charters during 1920, as follows: South Saltspring, Sayward, Kootenay Valley, Cobble Hill, and New Denver.

Membership.—The total recorded membership was 2,758, practically identical with that of the previous year. The ten institutes with the highest membership were:—

Nelson and District	104
Cowichan	101
Kelowna	95
Creston	85
Armstrong	77
Cranbrook	75
Oyster and District	68
Kaslo and District	65
Peachland	60
Matsqui	59

Flower-shows and Exhibits of Women's and School-children's Work.—Forty-six institutes organized events of the above character, this being an increase of ten over the previous year. "Better babies" clinics were held by Rutland, Colwood, West Summerland, Mission City, Penticton, and Surrey; fourteen institutes held flower-shows (including small fruits and vegetables); and twenty-six institutes held flower-shows combined with exhibits of women's and school-children's work. The excellent manner in which these annual events are run is deserving of high commendation. (*See* Appendix No. 3 for dates, etc.)

Household Science Branch.—This Branch was closed down on April 30th after having been in operation for sixteen months; Miss Olive Hayes, Domestic Science Demonstrator, obtaining an appointment with the Soldier Settlement Board.

Financial.—The grant in aid of Women's Institutes for the fiscal year 1920–21 was $7,000, whilst the sum of $3,757.04 was expended in 1920 from the vote of the previous fiscal year. (*See also* report by Mrs. V. S. MacLachlan.)

Pound Districts.

There are now a total of thirty-one pound districts in the Province. During the past year four new pound districts were constituted after thorough investigation, as follows: February 18th, Thetis Island; July 2nd, Pouce Coupe; August 9th, Abbotsford; November 11th, Oyama. Two other applications were pending at the close of the year.

Nothing of note has been reported by pound-keepers, except from the Glenmore District (Kelowna), where an unusual number of stray horses from the adjoining ranges have been impounded; after proving unsaleable these were destroyed, the expenses in the matter of fees and sustenance proving quite a charge on the Department.

Cost of Operation of Official Automobiles.

Mileage and expense records in connection with the automobiles purchased for departmental officials have been filed since 1917 and the accumulated data have now been compiled for reference.

The Department operated during the past year fourteen Ford touring cars and one Overland; complete data on twelve of the Fords being available.

The cars are grouped as follows: At Victoria, 6; Duncan, 1; Kamloops and District, 2; Salmon Arm, 1; Vernon, 2; Kelowna, 1; Summerland, 1; Penticton, 1.

The Fords were taken into use as follows: 1917, 3 cars; 1918, 2 cars; 1919, 4 cars; 1920, 5 cars.

The record mileage for 1920 was established by Geo. C. Hay at Kamloops, with a total of 8,254 miles, run at an average cost of 8⅕ cents per car-mile. (It should be noted that costs include tires, gas, oil, repairs, spare parts, and storage, but no allowance for depreciation.)

The official operating his car at the lowest rate was H. H. Evans, whose (1920) car averaged a cost of 4$^{9}/_{10}$ cents per car-mile, with a mileage of 4,829.

Mr. Evans's second car at Vernon had run 21,201 miles at the close of the year, at an average cost of 2⅘ cents per car-mile in 1918, 4 cents per car-mile in 1919, and 5$^{7}/_{10}$ cents per car-mile in 1920.

There are many interesting comparisons and deductions to be made from the records, and splendid service to the agricultural industry has been made possible by the furnishing of these automobiles to departmental officials. (Appendix No. 4 gives a summary for 1920.)

Respectfully submitted.

WM. J. BONAVIA,
Secretary.

REPORT OF DEPARTMENTAL SECRETARY *RE* FALL FAIRS.

WM. J. BONAVIA.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to report as follows with regard to the fall fairs held in this Province by Agricultural Associations during the year 1920:—

The total number of fall fairs held during the season of 1920 was fifty-seven, to fifty-five of which the Department of Agriculture supplied judges, varying in number from one to sixteen, as at New Westminster. The average number allotted was three judges—one for fruit and vegetables, one for general live stock, and one for poultry.

Following precedent, the Department of Agriculture supplied the majority of the judges for horticultural, field products, and honey, whilst a number of men prominent in live-stock and poultry circles were enrolled to assist the Department in same.

The details of the judges allotted were as follows:—

	Departmental Officials.	Outside Judges.
Horticulture	12	4
Field crops	2	1
Live stock	4	13
Dairy cattle	..	12
Goats	..	3
Dairy products	1	3
Domestic science	..	4
Honey	3	1
Poultry	1	14
Totals	23	55

Grand total, 78 judges.

To the University must be accorded thanks for kindly lending the services of Professors H. M. King, Hare, and Davis, and also to the Dominion Live Stock Branch, who supplied five judges to assist at the three big Coast fairs. (These are included in the second column.)

No general meeting or convention of the Fall Fairs Association was held in 1919 or 1920, the fair dates being allotted in the various circuits through correspondence with the Department. As has been pointed out in previous reports, this is an unsatisfactory arrangement at best, entailing endless letters to and from. It is often found difficult to reconcile conflicting dates and to arrange the circuits for convenient and economical operation by our judges.

Appended hereto will be found some of the more important criticisms and suggestions extracted from judges' reports which deserve the careful consideration of the officers of the various Agricultural Associations.

The detailed reports on each fair also may be the means, if followed up, of raising the standard of exhibits and popularizing the local annual event in many cases.

The vote for Agricultural Associations for the fiscal year 1920–21 was $35,000, whilst $4,831.35 was expended in 1920 from the funds of the previous fiscal period. Grants in aid of prize-lists in 1920 amounted to $32,068, as against $28,135 in 1919. (*See* Appendix No. 5.)

Respectfully submitted.

WM. J. BONAVIA,
Secretary.

SUMMARY OF RECOMMENDATIONS AND SUGGESTIONS BY JUDGES AT FALL FAIRS, YEAR 1920.

Fruit Exhibits.

Re Preparation of Specimen Fruits.—A considerable amount of carelessness is still apparent in showing apples and pears without stems, or with broken skins, scabby, scale, etc. If a judge acted strictly in accordance with his instructions, all exhibits showing disease would be eliminated from the show-tables, which would mean that there would be very little left.

Re Prize-lists.—If the annual grant is based on the amount of prize-money the prize-lists should be revised by the Department. The number of varieties and the amount of prize-money for each class should be the same for all fairs on Vancouver Island and the Lower Mainland. As the prize-lists stand at present, a fair such as Mission would be decidedly up against it, as their largest entries were in fruit and vegetables, whereas they only offer first prizes of 50 cents and second prizes of 25 cents, other fairs offering varying amounts from those figures to $1.50 and $1, so their grant would be much smaller than other fairs that very probably have only half the number of entries.

Prize-lists to eliminate Unsuitable Local Varieties.—Larger prizes for varieties that are most suitable for certain districts should be offered. No encouragement should be given to the growing of Upper Country varieties on Vancouver Island and the Lower Mainland. Many fairs offer the same prizes for all varieties.

Scoring District Displays.—At present the managements of various fall fairs compile their own score-cards for district displays, box-apple exhibits, and some other classes; at others the scoring is left to the judge's discretion.

The factor mentioned creates lack of uniformity in judging and in judges. Judges often use their own ideas regarding standards, which may often be quite different in varying localities, thus creating a condition liable to cause confusion and dissatisfaction among exhibitors from year to year; in some years exhibitors find their entry ruled out for a condition which in a previous year was not a deciding factor with the judge acting at that time.

In view of this it is suggested that a judge's score-card be compiled by the Department along similar lines to that in use by the Royal Horticultural Society of London, England.

Separate Classes for Distinct Types.—The managements of all Fall Fair Associations should be advised by the Department that, where two or more distinct types of fruit or vegetables under the same variety name exists, separate classes be made for same. For example: Stayman Winesap—Old Winesap; Yellow Newtown—Green Newtown; Summer Bartlett Pear—Winter Bartlett Pear.

Potato Exhibits.

The giving of prizes to the largest potatoes should be discouraged. The largest potatoes are nearly always very much off-type and are often made of small knobs caused by second growth. The largest potatoes are usually of poor quality.

The number of varieties of potatoes for which prizes are to be given should only be given to a few standard varieties. We must learn to standardize our varieties. Each district should choose two or three of the more adaptable varieties and prizes should be given for these and no others. The giving of prizes to the best display of potatoes should be discouraged, as this is just an advertisement for the farmer to see how many varieties he can produce. The result is, we get all colours, types, and varieties exhibited.

Grain Exhibits.

In grain classes the various Fall Fair Associations should definitely state the varieties of fall or spring grain for which prizes are to be given. Certain varieties, besides being of better quality than others, outyield them in bushels per acre and also in straw. It is little use for experimental stations to recommend certain varieties if exhibitors are allowed to exhibit any variety they wish.

Mangels, etc.

The giving of prizes to the largest mangels, etc., should be discouraged, if a fair is to be of educational advantage. Quality should count besides size. In a great many cases the largest

roots are hollow and of very poor quality. The long red mangel is an undesirable one for many reasons. Prizes which are given for this type of root should be done away and given for a more desirable type. The various Fall Fair Associations would do well to divide the root sections into a great many more classes. Roots of different varieties and types should be in a separate class. This point is worth emphasizing, as much of the dissatisfaction which now exists would be overcome. It is very difficult for the judge to decide the first prize, especially when he has two different varieties competing.

Poultry Exhibits.

A great deal of good could be done if the officers and members of all local Poultry Associations would take time to visit among the farming community and give a little advice and help as to the kind and quality of birds to exhibit, and perhaps sow the seed of a little more confidence and enthusiasm among the owners.

Poultry in East and West Kootenays.

There has been a very marked improvement in the quality of the exhibits shown at the various points. It is quite evident that the farmers and poultrymen are endeavouring to improve their stock to secure the best commercial results and at the same time to conform to standard requirements for the various breeds.

The judges found that a very large number of exhibitors were desirous to learn how to select layers and to keep up their weight, so that they could cull and market profitably fowls not suited for giving satisfactory return on investment and labour.

Live-stock Exhibits in East and West Kootenays.

At all the fairs in the above districts a need for more suitable housing arrangements was found, also a need for more interest and co-operation and better preparation of the animals exhibited.

Accommodation for Stock.

More attention should be given to comfortable quarters for stock before owners can be expected to bring good animals. This has its difficulties in the matter of funds, but all associations could and should be obliged to go over their buildings with limewash and a spray-pump before each show. The Department could aid them by giving the best and cheapest formula for making it and advising the handiest make of spray-pump and nozzle. The prizes are low for horses and the classification might be improved by making heavy draught 1,550 lb. and up; agriculture, 1,200 to 1,550 lb.; and a combination class 1,100 to 1,350 lb., to be ridden and driven in the place of the so-called general purpose.

Domestic-science Exhibits.

It is suggested that the women set aside the best specimens of their work when canning, preserving, etc.; these will then be ready for their forthcoming fair. Often the selection has seemed haphazard to the judges.

Such food as muffins, the essential value of which comes in its being served hot, should be eliminated from the prize-list.

No such stipulation as exhibiting jelly in quart jars should be made on a prize-list, even for the sake of uniformity. From the standpoints of correctness and economy it should be put in half-pint jelly-glasses.

Sewing exhibits should be shown free of pins or be limited to one pin each. Much time has to be wasted by the judge over this matter, as entries cannot be overlooked in rural communities.

Honey Exhibits.

In future, where the Department makes any contribution to the funds of an Exhibition Association or Bee-keepers' Association, the Department should insist on the right to appoint the judges and that their decisions be final. An effort should be made to get all the small fairs to adopt as nearly as possible a uniform prize-list and conditions of entry, and the Chief Inspector or the deputy advise as to the appointment of competent judges.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS. VANCOUVER ISLAND AND GULF ISLANDS.

E. W. WHITE, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for Vancouver Island and the Gulf Islands for the year 1920.

STAFF.

The Horticultural Branch has passed through another year with no Provincial Horticulturist in charge.

Being located in Victoria, your assistant has had to assume responsibility for a great portion of the correspondence passing through the Victoria office. However, in this work great assistance has been rendered by W. H. Robertson, Assistant Horticulturist for the Lower Mainland, whenever he was in the office.

On July 12th R. C. Woodward, a third-year student in Horticulture at the Oregon Agricultural College, Corvallis, Ore., and also a native son and resident of Victoria, was appointed to assist with the work on Vancouver Island. Most of Mr. Woodward's time was used in making a small-fruit survey of Saanich Peninsula, which includes the districts of Gordon Head and Keating. A tabulated sheet showing the result of this work is appended to this report.

HORTICULTURAL CONDITIONS.

It may be said that fruit-growers did not have a successful year during 1920. While prices received for small fruits were the highest on record, and probably marked the peak in this respect, still the yield was only 40 to 50 per cent. of a normal crop. A great deal of injury was done to strawberry-plants in December, 1919, when a week of very severe weather was experienced. This freeze injured the young plants and accounted for the great shortage which existed at planting-time in 1920 and the resulting high prices which were asked for plants.

Injury was also done to bearing plants as a result of having been "heaved up" and the young tender roots broken. With unfavourable summer conditions this resulted in a short crop.

Tree-fruits, especially apples, were a short crop. Pears were good and cherries were fair. Plums and prunes were a fair to good crop, but the fall rains, which started early and which were very heavy and continuous, did a great deal of damage to this crop.

Greenhouse and market-garden vegetable crops were on the whole good.

DEMONSTRATION STRAWBERRY-PLOT, GORDON HEAD.

As outlined in the report of 1919, the work was continued on this 6-acre plot in 1920. It was necessary to devote a great deal of time and attention to this work during the season.

A brief description will here be given of the crops which were grown on the various lots, following the rotation decided upon.

Lot 1.—This lot was in clover in 1919. It was first disked on November 24th, 1919, and ploughed on November 25th and 29th, 1919. It remained in this condition during the winter. On March 22nd it was harrowed twice and the dead furrows filled in with the disk.

Between May 8th and 11th five 5-yard loads of horse-manure were spread on the east half of the lot. On May 13th 1,136 lb. of Sir Walter Raleigh seed-potatoes were planted. On the west half of the lot, which received no manure, some chemical fertilizers were used at the time of planting.

It is not possible here to go into the details of the seed-selection which was practised before planting, nor the various combinations of fertilizers which were used. Suffice it to say that it was determined to make a start to improve the crop. The seed was selected from the crop produced on Lot 2 in 1919, of which we had no previous history. Every potato was hand-selected, and everything showing *Fusarium* or *Rhizoctonia* was discarded. The potatoes were then divided into No. 1 and No. 2, the former being the large potatoes and the latter the medium-sized ones. With the market price of potatoes $160 per ton, it was compulsory that there be as little waste as possible. When 245 lb. of No. 1 and 487 lb. of No. 2 so-called seed were available it was found that there was 168 lb. of potatoes which were first class for market

purposes, but on which the stem-end had been cut and traces of *Fusarium* exposed. It was decided to use these potatoes for seed and to keep a separate record of the results. There was also 156 lb. of small seed which was called No. 3, typical of the type used on the majority of farms, where the marketable potatoes are sold and the small ones kept for seed. This seed was also used. Besides, it was necessary to use 80 lb. of field-run seed to finish out the lot, giving a total of 1,136 lb. All seed was cut to two eyes where possible.

During the growing season the crop appeared to be fairly uniform throughout the whole acre and it was said to be the best acre of Raleigh potatoes in the Gordon Head District. The crop was harvested during the first week of November.

The first procedure adopted was to go through the entire patch and dig up all diseased stocks and weak plants. A total of 2,211 hills were dug in the forty-two rows, yielding 1,309 lb. of potatoes of all grades. A good proportion of the total was marketable, but the whole lot was sold within a few days after digging, the idea being not to have that class of stuff on the farm at all and run the danger of having it mixed with selected seed or of it ever being used for seed. It was the first discard.

The next step was to dig the balance of the crop by hand and to select for seed from each hill those potatoes thought suitable. Account was taken of the trueness to type, size, and yield of each hill. No potatoes were selected from hills yielding less than five potatoes to the hill. It was aimed to select potatoes of an average size for the variety. This selection yielded a total of 4,760 lb. of selected seed, which will be used for the selection of the seed necessary to plant Lot 3 in 1921, and there will be a balance left for planting other potato land on the farm.

The balance of the crop was then divided into marketable potatoes and culls. The marketable potatoes yielded 11,205 lb., while the culls amounted to 398 lb., which were immediately sold and taken off the place. The total yield for the whole acre was 17,672 lb., just 328 lb. less than 9 tons, which is considered above the average for a chocolate loam soil in the Gordon Head District.

This lot was harrowed twice on November 9th and approximately another 100 lb. of potatoes were picked up.

On December 2nd and 3rd the lot was ploughed in preparation for strawberries in 1921. On the west half of the lot, which received no manure in May, 1920, there was applied ¾ ton of salt herring at the time the land was ploughed, which was available in considerable quantities to growers at that time as a fertilizer. The method adopted was to drop the herring lengthwise in every third furrow, similar to the practice of dropping potatoes.

Lot 2.—This lot was in potatoes in 1919. It was ploughed on November 25th and 29th and remained in that condition all winter. On March 22nd the lot was harrowed twice and on the 24th the dead furrows were filled in with the disks. On March 26th it was disked twice, harrowed twice, and floated ready for planting. On March 23rd, 24th, and 25th a weevil barrier similar to the one erected on Lot 4 in 1919 was erected at a cost of $139.35, compared with a cost of $154.55 in 1919. It will be noted that this work was done before any strawberries were planted. Planting to strawberries was commenced on March 31st and the first three rows on the west side were planted. On April 1st the next twenty rows were planted and on April 10th the remaining twenty-one rows were planted. A total of 10,755 plants were set in fifteen hours by two men. The work on this lot for the balance of the season consisted of cultivating, hoeing, and cutting off blossoms and runners.

Lot 3.—This lot was in fall wheat in 1919 and it had been seeded to clover on April 22nd, 1919. In the spring of 1920 it was found that there was a very poor catch of clover, so that it was decided to plough the lot, which was done on March 24th and 25th. It was then harrowed twice, disked twice, and harrowed twice again, and planted on March 29th to 140 lb. oats, 30 lb. spring vetch, and 10 lb. hairy vetch.

On July 27th the crop was cut for hay and gave an estimated yield of 2 tons, valued at $22 per ton.

During September, October, and November this lot was manured with nine 5-yard loads of horse-manure. On November 29th and 30th and December 1st it was ploughed in preparation for potatoes in 1921.

Lot 5.—This lot was planted to strawberries on April 29th and 30th, 1919, and yielded its first crop in 1920. The first 13½ rows on the west side were planted to Marshalls and the balance, 30½ rows, were planted to Magoons.

It may be said of this lot that it is the worst of the six for strawberries. It is the lowest-lying lot and during the winter of 1919–20 the lower end was quite wet. As a consequence the plants on the lower or north end of the plot were very poor. The soil did not suit the Marshalls and they were practically a failure.

The 12 rows on the east side of the lot, approximately ¼ acre, were the best, and these were marked off and a record kept of the yield. A separate record was therefore kept of the 13½ rows of Marshalls, the next 18½ rows of Magoons, and the last 12 rows of Magoons. The yields were as follows:—

	Rows.	Crates.	Lb.
Marshalls	13½	20	231
Magoons	18½	187	677
Magoons	12	154	564
Totals	44	361	1,472

At average prices prevailing in 1920 this yield gave the following return:—

361 crates at $4	$1,444 00
1,472 lb. jam-berries at 20 cents	294 40
Total	$1,738 40

The first Marshalls were picked on June 11th and the last Magoons on July 19th. This showing is considered favourable under the prevailing conditions.

After the crop was harvested an interesting experiment was conducted on this lot, starting July 27th. In order to help control the weevil, 120 8-week-old cockerels were purchased and liberated on the lot. These cost 20 cents each or a total of $24. The following amount of feed was purchased: 3 sacks wheat, 2 sacks cracked corn, 2 sacks chicken-chop, and 25 lb. charcoal, at a total cost of $32.70. On October 15th it was decided to sell those cockerels remaining, and on that date 88 out of 120 were left, the others having died through sickness, smothering, and other causes. It was deemed wise to kill 7 of the 88 as they were too small for sale. Twenty-one of the largest were then selected and sold at a public auction in Victoria, realizing an average of 50 cents each or $10.50, less $1.05 commission, or $9.45 net. On October 16th the remaining 60 birds were removed to the Willows and placed in fattening-crates and fed for six days under the direction of the Poultry Division, and then sold on October 22nd at public auction for $54.20, less $5.45 commission, or $48.75 net. This was an average selling-price of 90⅓ cents for poorer birds than sold the previous week for an average of 50 cents. This variation was simply due to the changeableness of the market.

The total net receipts were $58.20, the total expenses being $56.70, leaving a credit of $1.50, no account being taken of the time necessary to feed and water the birds during their stay on the lot of slightly over two months and a half.

It is firmly believed that the cockerels did a very great amount of good in picking up migrating adult weevils. After the first week they did not confine themselves to Lot 4, but ranged over the entire 6 acres. It may be mentioned that the droppings from these cockerels were used to fertilize a portion of the east side of Lot 4.

Lot 5.—The majority of this lot was in fall oats in 1919, with a narrow strip of fall wheat on the west side. Between September 12th and October 4th, 1919, it was manured with eight 5-yard loads of horse-manure and ploughed on November 1st, 1919. On March 22nd, 1920, it was harrowed once, and on March 27th it was disked twice, harrowed twice, and seeded to 160 lb. of oats. On March 31st the lot was seeded to 16½ lb. red clover and 8½ lb. of alsike.

The oats were cut for hay on July 28th and yielded approximately 1½ tons, valued at $22 per ton. A good catch of clover was secured which appeared to be in a very satisfactory condition at the end of the year.

Lot 6.—This lot was also in fall oats in 1919. On November 3rd and 4th, 1919, the lot was ploughed. On December 15th one 5-yard load of horse-manure was applied. Between December 16th, 1919, and January 19th, 1920, seven 5-yard loads of horse-manure were hauled and piled on Lot 2, as it was impossible to apply it direct to Lot 6. On March 10th and 11th this manure was moved and spread on Lot 6. On March 23rd and 24th the lot was ploughed; on the 27th it was harrowed twice and seeded to 120 lb. of English Wonder peas with the seed-drill. The lot was harrowed once after seeding.

By June 7th the peas were in full bloom, but the lamb's-quarters had come up so thick that it threatened the crop, and it was decided to plough the peas down and plant potatoes. This was done on June 10th, using 844 lb. of field-run seed, the balance of the 1919 crop from Lot 2, and 40 lb. of small seed needed to finish the last two rows, making a total of forty-two rows in all.

This crop had unfavourable conditions to contend with, but despite this fact there was harvested on November 5th and 6th 7,706 lb. of commercial potatoes, 419 lb. of so-called small seed, and 277 lb. of culls, or a total of 8,402 lb.

On November 11th this lot was harrowed twice and ploughed on the 12th, and on the 14th it was seeded by hand to 135 lb. of fall wheat and 15 lb. of hairy vetch and then harrowed twice after seeding.. This lot will be seeded to clover early in 1921.

This completes a brief summary of the operations carried on during the past year. A detailed report will probably be available at a later date.

EXPERIMENTAL SPRAYING.

Stewart Bros.' Orchard, Keating.—As outlined in the report of 1919, work was continued on this plot, but the spray applications were varied slightly. The fall rains set in very early this year and there was a very heavy rainfall during the last few days of August which was unexpected. However, it cleared soon after and it was possible to make the first application on September 3rd.

Lot 1 was sprayed with 3–4–40 Bordeaux mixture and Lots 2, 3, and 4 were sprayed with 1–1½–40 Burgundy mixture. On October 19th Lot 3 was sprayed with 3–4–40 Bordeaux, Lot 4 with 6–6–40 Bordeaux, and Lot 5 with 1–9 lime-sulphur solution.

The results of the counts on infection, made on May 11th and 12th following the 1919 spraying, will be found in the report of the Provincial Plant Pathologist.

FLOWER-SHOWS AND FALL FAIRS.

On July 14th your assistant judged the annual flower-show of the Colwood Women's Institute and on August 30th the annual flower-show of the North Saanich Women's Institute. On both occasions R. C. Woodward rendered assistance.

The following fall fairs were attended in the capacity of judge of fruit and vegetables: Parksville, September 9th; North and South Saanich, September 13th to 15th, assisted by P. W. Anketell Jones; Alberni, September 16th; Victoria, September 20th to 25th, assisted by P. W. Anketell Jones and J. B. Partington; Courtenay, September 28th and 29th. The Provincial Exhibition at New Westminster was also visited on the last two days. A detailed report has been submitted.

INSPECTION OF NURSERIES.

This work was carried out according to the regulations in so far as possible. Inspections were made in the spring at shipping-time, during the summer, and again in the fall.

The scarcity of nursery stock continued and prices ruled very high.

INSECT PESTS AND DISEASES.

Owing to lack of time systematic orchard-inspection work has been impossible, but a great many inspections have been made, dealing with specific requests for information.

No serious outbreak has occurred during the year. Where the proper control measures have been adopted growers have been successful in combating the various troubles.

CONVENTIONS AND MEETINGS.

On January 14th to 16th the annual meeting of the British Columbia Fruit-growers' Association was attended at Vernon.

Early in the summer arrangements were made for the holding of the third annual meeting of Western Horticulturists, Entomologists, and Plant Pathologists at Vernon, August 17th to 20th. The secretarial work was allotted to your assistant and necessitated a great deal of time devoted to the work during July and early August. The meeting was a very successful one and a great deal of valuable information was made available.

A great many meetings were attended at different centres in the district during the year and addresses given on various horticultural subjects.

Demonstrations and General Work.

Demonstrations in various branches of horticultural work and personal visits to growers occupied a great deal of time during the year, although it has been impossible to cope with the numerous calls during the year and numbers have gone unanswered.

There is not much to show for this work at the end of each year, but it is extremely valuable and cannot be omitted. It is always appreciated.

Fruit and Vegetable-crop Statistics.

A great deal of time in the fall of the year is devoted to collecting fruit- and vegetable-crop figures to be used by G. H. Stewart, Statistician, in determining the total yearly production for the Province.

Pruning-schools.

Notices were again sent out during the fall offering five-day pruning-schools. This work is always popular and the prospects are that we will receive more applications than can be conveniently handled.

Correspondence and Office-work.

The office-work has been very heavy during the past year and the correspondence has increased, as follows:—1919: Inward, 1,158; outward, 1,440. 1920: Inward, 2,173; outward, 2,249.

A great many visitors have also called at the office seeking information and all the assistance possible has been given. This again is another line of work for which there is not much to show at the end of the year.

All of which is respectfully submitted.

E. W. White,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, LOWER MAINLAND DISTRICT.

W. H. Robertson, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I hereby beg to submit my annual report as Assistant Horticulturist and Inspector of Fruit Pests for the Lower Mainland District.

Division of Work.

During the past year my work has been carried on in the Lower Mainland District. Headquarters, however, have been maintained in the offices of the Department of Agriculture, Provincial Parliament Building, Victoria. The work of this office has been carried on by Mr. White, Assistant Horticulturist for Vancouver Island and Gulf Islands, and myself.

Horticultural Conditions.

The past season has on the whole not been a very satisfactory one for the fruit-growers, and the small-fruit men in particular. The latter part of the winter was exceptionally mild, followed by a wet, cold spring. A long spell of cold, wet weather during the strawberry-blossom period resulted in a very short crop. Raspberries and blackberries were also below normal, while currants and gooseberries may be considered a normal crop. The crop of tree-fruits was on the whole good and much freer from disease than usual.

Fall Fairs and Flower-shows.

During the past fall your assistant acted as judge of the fruit and vegetable exhibits at the following fairs: Trail, September 7th and 8th; Golden, September 10th; Athalmer, September 15th and 16th, assisted by C. B. Twigg; Nakusp, September 22nd and 23rd; Nelson, September 28th to 30th, assisted by E. C. Hunt; Creston, October 2nd, assisted by E. C. Hunt;

Ladner, October 8th and 9th, assisted by E. W. White. A full report giving number of entries and recommendations has been submitted to the Secretary of the Fall Fairs Associations.

Your assistant also acted as one of the judges at the flower-show held by the Hatzic Women's Institute on June 24th.

Inspection of Nurseries.

As in previous years, the work of inspecting the nurseries in the Lower Mainland was carried out. The principal inspection-work was done on the grounds of the British Columbia Nurseries at Sardis. Inspection was made in the spring at the time of digging, while a similar inspection was made in the fall when digging was being done for fall shipments. All stock taken up was carefully inspected and any showing attacks from insects or disease was destroyed or separated for treatment. On the whole, your Inspector found all stock well grown and very free from disease and insect pests.

Lectures and Demonstration-work.

During the past year a considerable amount of time has been devoted to both demonstration and lecture work. Demonstrations in pruning, both on the platform and in the field, dealing with the different systems of pruning, renovating of old orchards, and methods employed in pruning and caring for small-fruit plantations have been given.

Lectures before different farmers' organizations, dealing with various fruit-growing topics, have been given and much appreciated by the various audiences. This class of work is such that, while it is not possible to show results in a tabulated form, still it is a method of assistance that is of great benefit to the grower.

Codling-moth.

An outbreak of codling-moth at North Bend during the season of 1919 demanded the attention of your assistant during the past season. A system of control was inaugurated which comprised spraying with arsenate of lead and banding the trunks of the trees.

The first spray, consisting of arsenate of lead (powder), was applied as a calyx spray, May 21st to 25th, at the rate of 1 lb. to 40 gallons of water. A second spray of the same material was applied June 29th and 30th. The banding of the trees was also followed. This work was done on June 8th and examination of the bands was made every ten days or two weeks from that date, the last band inspection being made in September. It is proposed to continue this work during the coming year in an attempt to eradicate this trouble.

A codling-moth outbreak has also been reported from the New Westminster District. The area infested has been surveyed by J. W. Eastham and a system of control will be carried out during the coming year.

Orchard-survey.

During the past season, with the assistance of G. H. Stewart, a survey was made of the most important small-fruit areas in the Lower Mainland. The area devoted to the growing of small fruit is increasing each year. Some idea of the extent of the industry may be obtained from the attached table. (*See* Appendix No. 6.)

Agricultural Statistics.

A certain amount of time was devoted to the gathering of statistics relating to the fruit-crops and returns for 1920. The field-work was followed by work in the office compiling data on figures collected.

Office and Field Work.

During the past year, while there has necessarily been a certain amount of time spent in office-work, the largest amount of time has been spent in the field.

An increasing amount of correspondence has called for increased office-work. Large numbers of people who are prospective settlers make inquiries regarding the fruit-growing possibilities of the Province. These have to be attended to and also personal interviews given. Whenever possible your assistant has called on these new settlers and given assistance and advice regarding planting, pruning, spraying, or any phase of fruit-growing in which the grower was interested. Field-work of this kind is essential, but as it is impossible to show results in a concrete form is often not appreciated.

Bulletins and Circulars.

During the year just ending a few new circulars were added to our already extensive list. These were: Circular No. 61, "Making Lime-sulphur at Home"; Circular No. 58, "Currant and Gooseberry Culture." Circular No. 61, which was brought out at the first of the year, has since been revised and a short summary on the value of powdered lime-sulphur been added. A circular on the codling-moth was also issued, with cuts showing various stages in the life-history of the insect and recommendations for its control and eradication. This was for distribution in the districts where the moth is making its appearance.

Conventions attended.

During the past year the following conventions have been attended: The British Columbia Fruit-growers' Association at Vernon, January 14th to 16th; the Western Washington Horticultural Association, January 30th and 31st, at Puyallup; the third annual meeting of Western Horticulturists, August 17th to 20th, at Vernon.

By attendance at these meetings your assistant had the privilege of meeting many prominent horticulturists both from British Columbia and the Western States. Meetings of this kind cannot help but be of assistance in carrying on the field horticultural work of the district.

All of which is respectfully submitted.

W. H. Robertson,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, BOUNDARY, EAST AND WEST KOOTENAY DISTRICTS.

E. C. Hunt, B.Sc.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for the Boundary, East and West Kootenay Districts for the year 1920.

Staff.

In January the writer was placed in charge of the Kootenay and Boundary Districts, with headquarters at Nelson, the districts previous to this time being in charge of the District Horticulturist at Vernon.

C. B. Twigg was appointed District Field Inspector for the Creston District in December, 1919, and P. C. Black took the position of District Field Inspector for the Grand Forks District on July 1st, 1920. H. G. Greenwood was employed during the month of March as Instructor in apple-packing for the apple-packing schools held in the Kootenay District.

Pruning and Packing Schools.

Pruning and packing schools were arranged for during the early part of the year and a good deal of time was spent in organizing these classes. Your assistant personally conducted pruning-schools at Willow Point, Creston, Robson, Procter, and Arrow Park. Mr. Twigg held pruning-schools at Vallican and Nakusp. Packing-schools were held by Mr. Greenwood at Willow Point, Robson, Procter, and Edgewood. The writer also held a packing-school at Arrow Park.

The reports of these schools were sent in to the Department at Victoria by the various Instructors at the close of each school. The attendance at the schools was very good; in most of the cases the maximum number of pupils were present and a great deal of interest was shown in the work by the pupils taking part.

Announcements and application forms for pruning and packing schools for this year were sent out in December, and as an indication of the demand for instruction in this line of horticultural work the following applications have been received to date: For pruning-schools, from Grand Forks (held December 20th to 24th, 1920), Appledale, Procter, Gray Creek, and Canyon City; for packing-schools, from Grand Forks, Nelson, Needles, Erickson, Gray Creek,

Kaslo, and Wynndel. It is expected that quite a few more applications for pruning-schools will be received within the next week or so.

DISEASES AND INSECT PESTS.

Apple-scab.—This disease was quite prevalent again this year and was the cause of considerable loss to the apple-growers in the West Kootenay District. The weather conditions during May and June were very favourable for the spread and growth of this fungus. A lot of rain occurred at this time and the season was very backward, causing much delay in getting the sprays on as often as was necessary to prevent new infections to the fruit and foliage. Where the best of spraying was not done, quite a bad infection took place on the fruit of the most susceptible varieties.

Fire-blight.—Only one slight outbreak occurred of this disease in the Kootenay District. This infection was found in some pear-trees in the Fairview area at Nelson. The trees have been marked and proper steps will be taken for a clean-up before spring.

Pear and Cherry Slug.—This pest made its appearance again this year in the home orchards at Nelson and Fairview and has spread to some extent to the near-by commercial pear and cherry orchards. The slugs were most abundant during the months of August and September, at which time they caused considerable damage to the foliage of the pear and cherry trees where growers did not practice proper spraying methods. The insect is being kept well under control in the commercial orchards.

Colorado Potato-beetle.—This very serious pest is gaining some foothold in the potato-fields of the South-east Kootenay District. The area over which the beetle has spread has not been determined, but apparently it is increasing its area of infestation. Efforts will be made to check over the situation this coming year and the settlers will be advised in the best methods of control of this serious insect.

Other insects and diseases of the district were of about normal severity. Oyster-shell scale was quite bad in some of the old orchards at Grand Forks and steps have been taken for a general clean-up of this pest in the spring.

All of the above insect pests and diseases were attended to, as far as time would permit, by making personal calls on growers and giving advice and information on the methods of control and eradication.

COVER-CROP DEMONSTRATION.

In 1919 the Horticultural Branch of the Department of Agriculture undertook to demonstrate to the growers in this district the value of nitrogenous annual cover-crops in their orchards. It is the intention to run the demonstration for at least three years, using the same crop on the same plot each year. Each plot contains about 2½ acres and are located at Birchbank, Willow Point, Procter, and Creston.

This demonstration was started with winter vetch and sweet clover. Owing to the very dry fall and the unusual cold weather and no snow the sweet clover did not survive the winter of 1919 and 1920. The vetch was also injured to some extent by the low temperatures, but came on well in the spring and made good growth, when about the first of June it was ploughed under. Only the winter vetch was sown this year, as sweet-clover seed could not be procured. The vetch got an excellent start this fall, and with lots of snow for protection during winter a good crop can be expected this spring for ploughing under. Some work is also being carried on in the way of demonstrating to the growers the possibilities of growing winter-vetch seed for cover-crop purposes. Small plots of vetch of ¼ acre in size are sown and harvested for the seed. This work was carried on last year at Birchbank and Creston, and more than enough of seed was produced to reseed the cover-crop plots at these places and at very little cost to the growers. Other seed-plots were sown this fall for further demonstrating this line of work.

APPLE-SCAB EXPERIMENT.

Experiments were conducted in the control of apple-scab at Willow Point and Procter. As in the previous year, these experiments were carried on mainly for testing out the value of several commercial spraying materials—namely, liquid lime-sulphur, sulphur-dust, Bordeaux mixture (Nova Scotia formula, bluestone, 2 to 3 lb.; lime, 7 lb.; water, 40 gallons), Bordeaux dust, and dry lime-sulphur. Owing to a very light crop on the trees in the experiment, the results this year were not altogether a fair test for the materials. However, as in 1919, the

Flock of geese at Hatley Park, Vancouver Island.

A strawberry-farm on Vancouver Island.

A Toggenburg goat herd on Vancouver Island.

Poultry-farming pays in British Columbia.

first year of the experiment, liquid lime-sulphur and Bordeaux mixture gave the best control of the disease; dry lime-sulphur, about 80 per cent. as good control as lime-sulphur and Bordeaux. Sulphur-dust gave the highest percentage of scab-infection, and while the results from the Bordeaux dust were not so good as those obtained from the liquid sprays, they were quite satisfactory, other than the cost of the material, to warrant further trial.

Although several varieties of apples were sprayed in the experiment, the results were based on the actual count of fruit taken from the McIntosh Red and Northern Spy varieties. A detailed analysis of the results on apple-scab control in the West Kootenay District no doubt will be submitted by J. W. Eastham, Plant Pathologist, under whose supervision the experiments were conducted.

Fall Fairs.

Fall fairs were attended in the capacity of judge of fruit and vegetables at Burquitlam, Ioco, Chilliwack, Gifford, Surrey, Langley, and Slocan City, and assisted with the judging at Duncan. The writer also judged the fruit at the Richmond Fair and assisted in the judging of fruit at Vancouver. A detailed report on each of the above fairs, with marked prize-list, has been submitted.

Your assistant also judged at the annual flower-show of the Willow Point Women's Institute held on July 10th.

Orchard Visits and Demonstrations.

Many personal visits to different orchards throughout the district were made during the year; a great number of requests coming in from growers for demonstrations and advice on various horticultural subjects. This line of work takes up a great deal of time during the year and has been especially heavy this year, due to the fact that there has been a number of new settlers coming into the district. This work is always much appreciated.

In addition, the writer has also given assistance to the Land Settlement Board on horticultural subjects pertaining to the soldier settlement areas in the district.

Crop Reports.

Crop estimates and reports are furnished from time to time during the growing season, and at the end of the year a detailed report is made of the total production of all fruits and vegetables in the district. Information and data are also collected in a similar way from the jam-factories of the district. These reports have been submitted to the Department.

Inspection of Nurseries.

This work was carried out according to the regulations of the Department as far as it was possible. A most careful preliminary summer inspection is given the nursery stock in July or August; this is followed up by a thorough tree-to-tree inspection at the time of digging. Crown-gall and hairy root were the main sources for which any of the trees were condemned.

Office-work.

The volume of office-work has steadily been on the increase and necessarily had to be attended to. This was especially true since the horticultural work of the Kootenay has been directed from this office. There is a continuous demand for information on fruit-growing from prospective settlers, as well as from the new and old settlers; this with the necessary correspondence with the Department has taken up a great deal of time.

Your assistant attended the British Columbia Fruit-growers' Association Convention at Vernon in January, and also the third annual meeting of the Western Horticulturists held at Vernon in August. These horticultural meetings were well attended and a lot of good information was obtained relative to the industry.

All of which is respectfully submitted.

E. C. Hunt,

Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, OKANAGAN VALLEY.

W. T. HUNTER, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to report as follows in connection with the work of this district for the year 1920:—

GENERAL FRUIT- AND VEGETABLE-CROP CONDITIONS.

The fruit-crop of that horticultural district comprising the Similkameen and Okanagan Valleys and points on the main line of the Canadian Pacific Railway east of North Bend fell short of the 1919 crop by approximately 50 per cent. The soft-fruit tonnage was a little heavier than the previous year, but the quality and condition in general was much inferior, with the possible exception of cherries. Apricots and prunes did not size up to standard, and as this condition is unfortunately becoming more noticeable every year, the growers would be well advised to pay more attention to the thinning of these fruits and the feeding of their stone-fruit orchards in order that the size may be improved; otherwise the soft-fruit business will suffer. The shippers demand large sizes in peaches and apricots particularly, in order that they can meet the competition from Washington and California.

The apple tonnage fell very much below that of 1919, but the general quality was slightly better. Only one section of the district exceeded the 1919 shipments of apples, and in this section it is noticeable that the soil is not only deep and rich, but the water-supply for irrigation purposes is abundant. Further reference to the relation of the soil-fertility to the securing of annual crops will be made in this report. In passing, it may be remarked that a close correlation was observed this year between the light crop and the small size of the fruit in some cases and the general lack of vigour in the orchards and poor soil condition which accompanied this.

In most sections the apples sized up to average, but considerable falling-off was noticed among Jonathan, Duchess, and Wealthy apples in some of the districts which are large producers of these varieties. This is traceable to insufficient thinning of the fruit and to lack of vitality in the trees, due perhaps to winter injury in many cases, but more often to impoverished orchard soils.

Some complaints were received by your officials of apples breaking down in storage during the months of November and December. The variety most affected was Jonathan. A diagnosis was made of the factors and causes contributing to this condition, and it is the opinion of your officials that the heavy rains of late summer, combined with a tendency on the part of the growers to leave their Jonathans on the trees too late in order to gain colour, caused a general softening and an overripening that was injurious to the keeping qualities of this apple. The variety when picked in many cases was almost water-cored, due to the turgid condition of the cells of the apple as a result of the extremely high water content.

Practically the entire fruit-crop of the district was marketed in good season, to better advantage than ever before. The net returns to growers have been better than in previous years. This is due almost entirely to better organization for marketing among the growers and on the part of the shippers. Very few apples remain in the district at this time.

Vegetables were a heavy crop in 1920, particularly onions, potatoes, and tomatoes. Unfortunately for the growers, the early rains seriously interfered with the ripening and harvesting of tomatoes and a loss was taken by the growers on this crop in some sections. The early rains also interrupted the harvesting and curing of the onion-crop, which gave early promise of being very heavy. Crate and shed curing is not practised to any extent; consequently the growers were entirely unprepared to handle the tonnage when the wet weather set in. A very heavy loss was taken by the growers on onions. This may prove a blessing in disguise to the industry, as the acreage planted to this crop has been too large. The natural markets for this commodity will only consume a certain tonnage, and this tonnage has been greatly exceeded at times, with unfortunate results to all concerned, and the serious losses of 1920 will tend to eliminate a great many growers, particularly Orientals, and the tonnage produced in the future should be of better proportions.

On the whole, the district has had a very fair season in that just drawing to a close. Where the fruit-crop was heavy the growers did particularly well, and even where the crop was light the reduced tonnage was compensated for to some extent by the slightly larger returns received on that which was marketed. The orchards have gone into the winter in splendid shape, with an abundant supply of moisture in the soil and the tree-wood well ripened. The fruit-bud development and set is prime and the trees give splendid promise for a large crop in 1921. It is unsafe to forecast that crop at this time, but growers and shippers would do well to look carefully to the supply of box material, storage-space, and to other factors which combine for the efficient handling of a large crop, in preparation for the coming season. And your staff is strongly advising the growers to make provision for feeding their orchards with manures and fertilizers in order that the expected crop may be a record-breaker not only for quantity, but for quality.

Investigations and Demonstration Experiments in connection with Orchard and Soil Problems.

A 100-per-cent. crop annually is very much desired by all growers of fruit. Your officials are devoting much time to a study of this problem, and are constantly urging the growers to improve or alter their methods of orchard practice in order to attain their objective. On studying the light crop of this year it was found that in some cases the trees showed very little bloom in the spring, but in other cases a heavy show of bloom was not followed by a heavy set of fruit and a good crop. The trees in this case apparently lacked the vigour to set the fruit. A very heavy June drop occurred and the drop was of much greater duration than usual. Investigations were conducted in order to diagnose the causes leading to this lack of vigour and consequent light crop which occurred in orchards where the early indications pointed to a heavy crop, but where the crop harvested was only light. The heavy, early frosts of the previous fall, and the hard, open winter which followed, very seriously impaired the vigour of the trees and reduced their vitality. In some cases evidence of serious root-injury from freezing was observed, but after careful observations and investigations your officials are definitely of the opinion that the light crop of this year was more directly due to lack of plant-food in many of our orchard soils than to any other one cause. The splendid crop of 1919 drew heavily on the trees throughout the entire growing season, and as a consequence growth was hardly normal that season and the bud-development weak. Many orchards of the valley did not have the vitality to withstand the hard winter, nor to repeat with another heavy crop in 1920.

A comparison of tree conditions in orchards which are annual bearers with trees where a good crop is borne only every other year reveals the fact that in the former ideal soil conditions and treatments were generally found, while in the latter plant-food was usually deficient in the soil. The controlling element appears to be nitrogen. There are too many orchards in the valley in which the foliage is too light in colour, the leaves being pale green, thin, and small in size, while the twig and terminal growth, though it may be of the desired length, is very weak and the buds small, and with trees in such conditions heavy crops can be expected only every other year. In such orchards the crop was generally light in 1920, or, if heavy this year, had been light in 1919.

Reports were being received in the district with reference to the heavy crops which were annually being obtained by certain growers in the Wenatchee (State of Washington) District, and with the idea of studying these orchards at first hand several organized parties of growers were conducted by your officials to this section. Every courtesy was extended to the growers from British Columbia by the horticultural officials of the Washington Department of Agriculture, and it is due to their kindness and assistance, and to that of the individual growers of that district whose orchards were visited and studied, that much very valuable information was received by all who visited Wenatchee. In those orchards in that section where heavy annual crops of high-grade fruit had been produced over a consecutive period of years it was found that very special attention was being given by the growers to the maintenance of the soil-fertility. Nitrogenous cover-crops were being extensively used, and in addition in many cases heavy and regular applications of nitrogenous manures or fertilizers were being added. When irrigation-water was available in sufficient volume, the best and most economical results

were being received from the persistent use of alfalfa as a permanent sod-mulch. In the opinion of your officials and of those growers who accompanied them, and also of those Wenatchee growers who were questioned on the subject, alfalfa used in this way offers a solution of the problem of maintaining the soil-fertility in orchard soils at the least cost. No cultivation or cutting is practised, but water in great abundance is used. The consequent elimination of the greater part of the labour of clean cultivation, or even that necessary in any system of annual cover-cropping, can only mean that apples can be produced at lower cost. In conclusion, it might be said that the success that these growers are attaining in being able to secure maximum annual crops is undoubtedly due to the maintenance of the soil-fertility in their orchards.

A series of experiments is being planned to commence in 1921 to study the alfalfa-sod-mulch system with reference not only to its water requirements and to the cultural methods as advocated by the Wenatchee growers, but in an effort to determine the best system of establishing the alfalfa-sod-mulch in this district. It is evident that great care and attention must be given the orchard during the time that the alfalfa is becoming established. Nitrogenous cover-crops are recommended to precede the alfalfa, or the trees may be stimulated for a year or two by the use of nitrogenous fertilizers. These points will be carefully studied throughout the district. The experiments will be planned and executed in co-operation with individual orchardists. While the alfalfa-sod-mulch system seems to be the best system in vogue in the Wenatchee District by virtue of its soil-building properties, and by reason of its being the most economical from the standpoint of costs, your officials are not prepared to advise its general use in this country until it has been thoroughly tested out in actual practice not only as to its adaptability, but also as to its water requirements.

The orchard plots where the use of leguminous cover-crops is being demonstrated are in fair condition this fall. Several hundred pounds of hairy-vetch seed and some sweet-clover seed was purchased and distributed to growers who were willing to conduct a three-year comparative test of these plants as annual cover-crops. In all cases the orchards were carefully selected by your officials as to their accessibility and as to the type of soil. The results will be carefully noted, and it is hoped that they will be of such a nature that the growers will be convinced that their more general use in orchard practice is not only desirable, but necessary.

In order to test out the value of lime for the Salmon Arm section a series of demonstrations were organized. A perusal of the report of your Inspector for that section will show the direction in which progress is being made. The results, due to adverse climatic conditions, have been negative. It is the intention to continue this work and, if possible, extend the experiments to other sections of the district. This is most advisable in view of the fact that there is a strong demand for authentic information on the subject. This desire for information is no doubt due to the interest in the subject which is being fostered by private concerns who are now in the market with this commodity.

INSECT PESTS AND PLANT-DISEASE CONTROL WORK.

The season of 1920 was exceptionally favourable for the natural control and suppression of insect pests and diseases injurious to tree-fruits. The unprecedented early, killing frosts of the fall of 1919, followed by a long winter of intermittent low temperatures, killed many of the over-wintering insects and the spring and summer hatches were weakened and easier to control. This factor, combined with more efficient spraying methods by the growers, kept the pests and diseases in suppression, and a perusal of the report on the various insects and diseases will reveal how effective were the control methods in general throughout the district. With the exception of codling-moth, the control has been all that could be desired. In the case, however, of this latter insect pest, factors over which it is hard to exercise any control so nullify the work of your staff that it is hard to draw such optimistic conclusions. However, with a tightening-up of quarantine and inspection services, by various methods of control and eradication which have been inaugurated recently, and by better control of railway-cars under suspicion of being infested with codling-moth, your officials are confident that this serious menace can be successfully combated in the future.

Below will be found a detailed report on the various insect pests and diseases throughout the district, followed by the individual reports of the various district officials.

Control and Inspection Work in Detail.

Codling-moth (Carpocapsa pomonella).—Separate reports dealing with the actual quarantine-work in connection with the codling-moth are appended by those of your officials who were directly responsible for the carrying-out of this important work. Altogether, throughout the season, outbreaks were combated at Westbank, Kelowna, Okanagan Landing, Swan Lake, Vernon, and Walhachin, and inspection of foreign refrigerator-cars was carried out at Okanagan Landing on the Canadian Pacific Railway and at Keremeos on the Great Northern Railway.

At Westbank no worms were found this year, nor in 1919. Three arsenical sprays were applied and five band inspections were taken, and this work will be duplicated in 1921. It is hoped that the quarantine can be lifted at the end of the season.

At Kelowna worms were found late in October on an area of about 20 acres within the city limits. As the season was too far advanced at the time the outbreak was located for accurate location-work to be done, we can only hope that the infestation will be confined to this area. Strict quarantine regulations will be enforced in that section in 1921, and a close inspection conducted throughout the whole season over a wide area adjacent to that on which the worms were actually found, in an effort to centralize and locate absolutely the actual area of infestation.

In the Okanagan Landing, Vernon City, and Swan Lake outbreaks the work of your officials in carrying out the quarantine regulations necessary is very fully covered by the detailed report of the special official who had that work in charge and which is appended herewith. The results from the work which was carried out in the Vernon City area were particularly gratifying. Under the measures inaugurated in that section, where the fruit was pulled from the trees in its young stage, in addition to the regular control sprays being applied, no worms were taken this year. Your officials are convinced that this method of eradication will eliminate this pest from any given area within a known period, and the method is to be strongly recommended.

At Walhachin the control-work has been practically dropped, as no worms had been found in the area under suspicion for some years. However, band and fruit inspections were carried out throughout the entire season to check up the control-work which had been carried out the preceding years. In October a fresh outbreak was discovered in an orchard adjacent to the Canadian Pacific Railway sidings and quite removed from the area under quarantine previously. It is regrettable that strict quarantine measures will have to be inaugurated in this district next season in the area now infested in order to combat this outbreak.

Your attention is directed to the absolute necessity of a system of car-sterilization being brought into effect to deal with the foreign-car situation. It is undoubtedly from these cars that the new infestations of codling-moth occur, and as long as they are allowed to roll into the fruit districts before being sterilized, or even inspected and cleaned, new infestations will occur. The work of your officials in the car-inspection work at Okanagan Landing and Keremeos points has been highly satisfactory, but the necessity of having this inspection take place outside of the fruit districts is of vital importance. Appended to the report are sketches which very graphically depict the relation of the railroad sidings to the subject of codling-moth infestation in fruit-growing sections, and a study of these will show the imperative need of having cars suspected of being infested with codling-moth disinfected or cleaned at points outside of the fruit districts.

Blister-mite (Eriophyes pyri).—This pest is the same as that which up to the last few years had only been troublesome on pears, where owing to the peculiar bud formation of this fruit it is easily controlled by a dormant spray applied as the buds commence to swell in the spring. Over the past two seasons an increasing amount of infestation has occurred on the apple. As apple-buds are of a pubescent nature and the organism can gain entrance beneath the bud-scales as soon as the buds show any appreciable swelling, great care must be exercised by the growers to see that the controlling spray is applied very early in the spring, almost before the buds start to swell. Control of this pest can only be effected where such a practice is followed, and in addition the spray material must be applied under high pressure to be of greatest value.

As the area of infestation is spreading gradually north through the valley from those sections in the South Okanagan where it was first observed some time ago, and as there appears to be a general lack of knowledge on the part of the growers as to the necessary methods to be employed to combat and control this pest, a series of demonstrations are planned for the coming spring in sections where blister-mite on the apple appears to be getting beyond control. It is

hoped that these demonstrations will serve their intended purpose, that of educating the growers as to the most effective method of controlling and eradicating the blister-mite on apples, and that in the near future correctly applied sprays will at least reduce the damage done by this pest to a minimum.

Apple-aphis (Aphis mali).—Apple-aphides were not unusually active the past season. This may be due to climatic factors the previous winter influencing the early hatch of aphides, but is probably more due to effective control by the growers themselves of the pest in the early season by efficient and timely spray methods.

Woolly Aphis (Eriosma lanigera Haus).—Woolly aphis is reported very prevalent in increasing quantities from several districts. Fortunately, the degree of infestation was comparatively slight, due to the heavy mortality of the over-wintering adults caused by the severe climatic condition of the late fall and winter of 1919. An unusually large percentage of the aphides were killed. Control methods as advocated by your staff under the direction of the Entomological Branch proved very effective in combating this pest.

Peach-worm (Arnarsia lineatella).—As a result of the active campaign which was inaugurated two years ago in the Southern Okanagan for the control and eradication of this widely distributed insect pest of the stone-fruits, particularly peaches and apricots, very effective spraying was done the past season by the growers and very little damage was reported. Dormant lime-sulphur, strength 1–9, applied under high pressure as near the blossoming period as possible, in what is known as the pink stage, proves highly efficient. Close inspection of all stone-fruit is conducted by your officials throughout the shipping season, in an endeavour to not only prevent the shipping of fruit infested with worms, but in order that your officials may check up growers who are neglecting to spray, or who are not obtaining successful results from their spraying operations, in order that they may not only be compelled to spray, but that they may be directed to spray more effectively.

Oyster-shell Scale (Lepidosophes ulmi).—From time to time the attention of the growers in certain sections has been directed to the imperative need of measures being taken for the eradication of this insect. Fortunately, natural factors so influenced the life-history of this pest the past season as to reduce to a minimum the amount of damage to the orchards. However, remedial measures will be urged the coming season in the hope that the damage will be kept at a very slight percentage.

Powdery Mildew (Podoshpæra leucotricha).—Owing to the unusually clear fine weather which prevailed during the spring and early summer months throughout the Okanagan Valley, only very slight infestations of this disease were reported from the districts where the disease has usually been troublesome. It was planned to conduct efficiency tests with the different spray materials available at Penticton the past season, but owing to a change taking place in the personnel of the local Inspector in that district in April, it was impossible to properly organize and plan the experiment and it was abandoned. However, it is hoped that these tests can be inaugurated the coming season to extend over a period of at least years. The early application of dilute lime-sulphur 1–25, repeated every ten days, as advised by the officials in the State of Washington, is giving good satisfaction where consistently and carefully applied.

Fire-blight (Bacillus amylovorus).—Owing to the strict control measures which have been enforced by your staff during the years immediately preceding, and to some extent to the immunity against this disease which has been attained by the orchards as a whole, very little serious trouble occurred from fire-blight the past season, except in isolated cases in a few sections. The late summer rains of September caused a slight outbreak to occur at Kelowna, which was promptly and effectually controlled by the officials at that point. In the Duck Lake section a considerable number of orchards showed many hold-over cankers present in the spring. An active campaign was inaugurated by your staff at Vernon, and at their instigation a local protective organization was formed to deal with the condition and prevent the impending outbreak. A local Inspector was engaged by the growers themselves, whose duty it was to devote himself entirely to the work of cleaning out the disease, acting under the direction of your staff. The result was very gratifying, inasmuch as blight was most effectively controlled in the district. The entire cost of the service was borne by the growers themselves. This system can be highly recommended for similar outbreaks of a like nature in any district.

Slight outbreaks were also reported from Penticton and Salmon Arm Districts, but were fortunately of a very incipient nature. Full publicity has been given to the new regulations

covering blight-control as in the "Agricultural Act Amendment Act, 1919," and it is the intention to strictly enforce these regulations the coming season.

Apple-scab (Venturia inæqualis).—As a result of the splendid weather which prevailed during the spring and summer months of 1920, and to some extent to the more active spraying measures which were adopted by the growers in those sections where apple-scab occasionally causes considerable loss, very little damage occurred from this disease this year.

In a year of average precipitation in the spring and early summer months apple-scab does a considerable amount of damage in the more northern sections of the district. Experimental tests with various spray materials at different strengths have been carried on over a period of years in the Vernon and Salmon Arm Districts and much useful data was secured. By reference to the Vernon District Report for 1919 and the Salmon Arm Report for 1919 and 1920 information may be obtained as to the direction in which your officials are working and the results which have been attained. Owing to the pressure of work at the Vernon office and the fact that the staff was under strength, coupled with the fact that the orchard on which the work had been previously conducted had changed ownership, the experimental work on apple-scab control had to be abandoned in Vernon for this year.

It is the intention of your officials to again take up this work in the spring of 1921 in order that the experiment which was originally planned, and which was conducted so successfully over a period of years, may be completed and definite conclusions arrived at.

Drought-spot and Related Physiological Diseases.—In certain sections of the district reports were received of serious damage by drought-spot, cork, etc. On investigation by your staff it was found that in almost every case the trouble resulted from a failure on the part of the grower to properly conduct his orchard practices in such manner as to maintain a regular water content in the soil. This was probably due to their failing to conserve or replenish the humus in their orchard soils. The addition of decaying vegetable matter to the soils, thereby increasing the water-holding capacity of these soils, seems to give good results in eliminating this trouble from the orchards. Your staff have accordingly strongly advised the more extensive use of leguminous cover-crops in the district. Reference can be made to the splendid article which appeared in the *Agricultural Journal* of the Department of Agriculture for December, 1920, dealing with this trouble. This paper was read at the meeting of Western Horticulturists in Vernon in August, 1920, and the work which has been done by the authors may be accepted as being the most comprehensive and authentic work on the subject, and their recommendations for the control of the trouble are being advised by your officials.

Pruning-schools.

A considerably greater interest is being taken by the growers of this district in the pruning of their fruit-trees during the past few years, and in comparison with the general indifference which prevailed during the years immediately preceding this is very encouraging. This indifference may not have been due to a lack of interest on the part of the growers as a rule, but to some extent to the general scarcity of labour. However, part of the lack of attention to this important orchard practice was directly due to the low returns which were being received for fruit some years ago. This condition has fortunately been remedied the last few seasons.

Your officials have, as a result, been besieged with requests for personal advice and for pruning-schools all over the district. Accordingly, acting on the precendent established by our predecessors, your officials have endeavoured not only to give much of their time to paying personal visits to orchards where advice and assistance was needed and requested, but to hold as many organized pruning classes in the different sections as was possible. These have been conducted for periods of five days in almost every case and careful instruction by competent instructors was given.

During January, February, and March of 1920 fourteen pruning classes were held, with a total attendance of 168 pupils. Classes were held at the following points: Sorrento, Kaleden, Cawston, Ewing's Landing, Summerland, Penticton, Grand Forks, Rutland, Glenmore, Coldstream, B.X. District, South Vernon, Oyama, and Okanagan Centre.

During November and December of this year nine schools with a total attendance of 103 were held at the following points: Kelowna, Coldstream, B.X. District, Penticton, Okanagan Centre, Peachland, Ellison, Summerland, and Naramata.

Careful instruction on the principles and practices involved was given, and judging by the numerous requests for more schools in these and other districts which have since been received, the information and instruction given must have been of great value to the growers and the service justified.

In order that all requests for schools may be granted it is necessary to have several Instructors conducting schools at one time, and it is the desire of your officials to have the information and recommendations given by these Instructors of a uniform nature. Accordingly, a conference of all the district officials and Instructors will be called to discuss the whole problem of pruning in an endeavour to bring the work up to a uniform standard. In the opinion of your officials this is very essential.

Applications are on file at the present time for pruning-schools at the following points: Rutland, 36; Kelowna, 22; Salmon Arm, 63; Vernon, 24. Schools will probably be conducted at these points during January, February, or March, 1921.

PACKING-SCHOOLS.

Acting on the recommendations of our predecessors, to the effect that packing-schools in the larger and better organized fruit-growing districts were of little value either to the industry or to the pupils, no schools were held in these centres the past year. In the smaller and more isolated sections, where much of the packing is done on the ranches, packing-schools were advised. As a result of this policy receiving your endorsation, only one application for packing-schools was considered. Instructions were accordingly given at Sorrento to a class of thirteen, and the service was much appreciated by the growers of that district.

WEEKLY NEWS LETTER.

In answer to the ever-increasing number of requests for statements as regards the crop and general orchard conditions throughout the valley, received from all over the country, there was commenced in June of this year publication of a weekly news letter. News of interest to growers, shippers, and buyers of fruit was included. Notes on climatic and orchard conditions, crop estimates and movements were features. But the greatest amount of space was given to a report on crop conditions throughout the season, and from time to time advice as to remedies for certain deficiencies in crop conditions and orchard practices was given. That the letter was popular was evidenced by the increasing demand for copies as the season advanced, and also to the prominent space which was freely given to the news letter in the newspapers, by the editors of which it was evidently much appreciated. However, your staff was to some extent more or less unprepared to handle to the greatest degree of success the publication of this letter, especially when the equipment was not of the best. It is the desire of your officials to be in a much stronger situation by June of the coming year, both as regards staff and equipment, and it is the intention to publish a thoroughly reliable report on orchard and crop conditions, etc., throughout the entire fruit-shipping season.

DISTRICT BULLETIN.

In an endeavour to keep the staff, scattered as they are over the entire valley, fairly conversant with the work of each man, and to enable them to discuss intimately among themselves various problems which arise throughout the season, and which could not for reasons of publicity be discussed openly in the weekly news letter, a staff publication was issued each week from the headquarters in Vernon and circulated among all the officials of the Horticultural Branch. That its circulation was justified is best testified to by the interest and enthusiasm which it created. General recommendations with reference to remedial measures of control of pests and diseases, recommendations approved, etc., were included from this office from time to time. The bulletin will be elaborated upon this coming season and should prove of ever-increasing value to the men engaged in the work of the Horticultural Branch.

LECTURES AND MEETINGS.

Numerous lectures were given throughout the season by your officials in the different sections on various horticultural topics, and judging by the average attendance at these meetings they were generally acceptable. Lectures on orchard-soil fertility were given by your Horticulturist at Summerland, Peachland, and Glenmore during November. Numerous inquiries and requests have been received for more lectures on horticultural topics, and to supply this demand it is proposed to hold a two-day series of meetings throughout the Okanagan in the larger districts

and a one-day meeting in the smaller sections. A strong programme of speakers is being arranged and your officials are confident that a good attendance will be given them.

In August the third annual meeting of the Western Horticulturists and Entomologists was held at Vernon, and the visitors were the guests of your officials and of those associated with them at this point. Delegates were present from Oregon, Washington, Idaho, and British Columbia, and papers were read and discussed on various subjects of great importance to the fruit-growing industry of the Province. Much useful information was obtained from the meetings by the members of your Horticultural Branch.

Agricultural Fairs and Exhibitions.

Your officials acted as judges of fruit and vegetables at all the fairs held in the district this year, and separate reports have been forwarded covering these exhibits in each case. Your assistant acted as judge of fruit and vegetables at Penticton, Kelowna, Armstrong, Vancouver, and New Westminster, in company with or accompanied by other officials of the Horticultural Branch. A separate report on these fairs has been forwarded.

Information Booth at Fall Fairs.

In conjunction with the Dominion Entomological officials for British Columbia, your officials conducted a general information booth at all the fairs in the district. Actual specimens of diseased fruits and fruits infested with injurious pests and diseases were prominently displayed and literature in the form of bulletins dealing with control measures was distributed. Bulletins and circulars dealing with general orchard problems were also available to those desiring such information. An official of the Department was in attendance at each fair to answer questions, distribute literature, etc. It is intended that the scheme shall be elaborated greatly the coming season and thereby increase the efficiency of this service.

Statistical and Office Work.

Statistical.—The collecting of statistics with reference to the annual output of fruit and vegetable products from the district occupies a great deal of the time of your officials during the winter months. As soon as collected and compiled these are forwarded to the Statistician for the Department of Agriculture, by whom they are finally revised and published.

Appended to this report will be found a tabulated report of the fruit acreages of the district. This report shows the total acreage planted to fruit in the district, the total number of all trees planted, and the approximate age of the trees. The report is divided into sections, and from the report can be ascertained the total acres, the number and varieties in any large proportion, and the approximate number of trees of bearing and non-bearing ages. The report further shows the total number of trees of each variety for the entire district classified according to their age into bearing and non-bearing. This report is the result of work which was commenced about October and which has been successfully completed at this date.

Office-work.—Local offices of the Horticultural Branch are maintained in the district at Penticton, Summerland, Kelowna, and Salmon Arm, and the work conducted at these offices is supervised from the central office at Vernon. As judged by the number of growers who visit these offices throughout the season, their maintenance is justified. A decided effort is made at all times by your officials to induce the fruit-growers and farmers of each community to look upon the office of the Provincial Department of Agriculture as the local centre for the agricultural activities of that particular section. This policy is meeting with splendid results, and the benefit of such a centre is appreciated by the growers and others who have taken advantage of the opportunity.

Owing to the large number of calls which are being received at these offices during the past year, a great deal of the time of your officials is taken up by these duties in the various offices. These calls are greater in number than ever before, owing no doubt to the large number of new settlers who are coming into the district. The advising and assisting of these callers is a very necessary work, but unfortunately it compels your staff to spend a considerable portion of time in the offices, when no doubt work which would show more definite results could be done out in the field with the growers.

All of which is respectfully submitted.

W. T. Hunter,
District Horticulturist.

REPORT OF DISTRICT FIELD INSPECTOR, VERNON.

H. H. Evans.

W. T. Hunter, B.S.A.,
District Horticulturist, Vernon, B.C.

Sir,—I beg herewith to submit a brief annual report of the season's activities as District Inspector for Okanagan Centre, Vernon, and Armstrong Districts for the year 1920.

Judging Fall Fairs and Garden Competitions.

Your Inspector assisted in judging at the following fall fairs: Oyama Juvenile Fair and Garden Competition; Armstrong, Lumby, and Penticton Fall Fairs. Separate report on which has already been submitted.

Pest and Inspection Work.

Inspection of Export Fruit and Vegetables.—Two cars only of apples for export to Australia were inspected at Vernon during the past season. The Australian export trade with British Columbia was light, due no doubt to the light crop and enhanced prices on domestic sales.

Inspection of Foreign Cars.—This work will be found incorporated in the detailed report on codling-moth control work.

Field-work.

Codling-moth Control Work.—A separate detailed report of this work is attached.

Fire-blight Control.—During the winter of 1919 to April, 1920, your Inspector spent considerable time through the district in an endeavour to have growers clean up on fire-blight during the dormant season, and in general very good results were accomplished. There has, however, during the past growing season been a very general, though not dangerous, spread of the disease again, due possibly to climatic conditions; i.e., greater than average summer precipitation and humidity.

In the Duck Lake and Okanagan Centre sections, where in 1919 the disease obtained a serious hold, we paid particular attention during that winter to cleaning up in an efficient manner. To augment this work we appealed to owners in the more seriously affected sector, comprising over 200 acres, to adopt community control measures for the season 1920. In this we were successful. The following plan was adopted: A man competent to carry on the work of cutting fire-blight was engaged for two months to give his whole time to fire-blight cutting over the 200 acres during the period of most rapid dissemination of the disease. The owners taxed themselves *pro rata* per acre to pay the man's wages; the arrangement and the results obtained have proven very satisfactory. This method of controlling fire-blight in any one section is to be very much commended.

Oyster-shell Scale.—The ravages of this pest have been less noticeable during the past season, undoubtedly the result of more systematic spraying methods adopted for its control.

Aphis.—The aphis, generally speaking, has not been a serious orchard pest in the past season. Woolly aphis, though not as numerous as in the season preceding this, was very prevalent, and we received many inquiries from the various sections respecting control measures.

Powdery Mildew.—In the Okanagan Centre and Oyama sections, where this disease did considerable damage in 1919, the orchardists in 1920 carried out very effectively the control recommendations advised by the Department officials, with the result that little damage and loss was sustained from this disease in comparison with 1919.

Experimental Work.

The experimental pruning being carried on by the Department in the Vernon District—the same being in charge of your Inspector—is progressing in a most satisfactory manner.

Cover-crops.—An initial experiment with hairy vetch, also sweet clover, was started at the Rainbow Ranch, Okanagan Centre, in the fall of 1919. The stand of the crops last spring was not satisfactory for ploughing under owing to a great deal of winter-killing and lack of germination. The crops were allowed to grow through the summer months and to ripen seed. In August the whole mass of vegetation was disked under, and in the late fall of 1920 there was a good stand of hairy vetch and sweet clover from the seed produced and worked into the soil by the disking.

It is anticipated that there will be a good green crop to plough under in the early summer of 1921. Our District Horticulturist, W. T. Hunter, will have more to say on experimental work with cover-crops now being planned.

Pruning-schools.

Your Inspector during the months of January and February personally conducted five pruning-schools at Vernon, Oyama, and Okanagan Centre. In each instance lectures were given the pupils on the principles of pruning, grafting, and budding of fruit-trees and propagation of small fruits. The practice of pruning was given in different orchards containing the various varieties of fruit and among all ages of trees.

In all the classes great enthusiasm was displayed by the pupils, many of them showing marked aptitude for the work. Each school was given ten periods of tuition covering in all five days. Full reports on the above have already been submitted.

We wish to state that these pruning-schools created much enthusiasm and general interest, the satisfaction given being reflected in the steady demand for similar schools for the winter 1920–21.

General.

The great portion of your Inspector's time during the past year has been devoted to codling-moth control. There is, however, an insistent and ever-growing demand from growers for visits and advice on the various problems with which they have to contend, and consequent enlarging of office duties owing to the absence from Vernon of our District Horticulturist, whose duties demand so much of his time and attention to outside districts and their problems. Much of this work must necessarily be handled by your Inspector.

All of which is respectfully submitted.

H. H. Evans,
District Inspector.

REPORT ON CODLING-MOTH CONTROL WORK, VERNON, OKANAGAN LANDING, AND SWAN LAKE SECTIONS.

H. H. Evans.

W. T. Hunter, B.S.A.,
District Horticulturist, Vernon, B.C.

Sir,—Following is the report of control measures carried out by the Department of Agriculture, through the writer, assisted by R. A. Newman and a staff of fieldmen, for the season of 1920 in the codling-moth infested areas of the Vernon District. Table of spray dates, material captured, cost of operation, etc., are attached.

Total acreage under treatment in 1920 was approximately 235 acres, divided as follows: Okanagan Landing, 115 acres; South Vernon, 100 acres; Vernon Town 20 acres. Actual infestations have this year been found on approximately 105 acres; at South Vernon 100 acres are contiguous to the infested area, the work performed here being for protection and insurance against the further encroachment of the pest. Approximately 30 acres in all are being worked in the Vernon Town area. On about 10 acres of this area, where infestation existed in 1919, the Department's policy this season (1920) was to destroy all fruit in an attempt to eradicate the moth from this area, to stop further spread through the balance of the city lots carrying fruit-trees and ultimately to the commercial sections now clean. On the balance of the 30 acres north of the infested area all trees were scraped and banded; band and fruit inspection was carried out periodically; negative results being obtained as regards the capture of codling-moth material. The Department of Agriculture bore all costs in connection with this work. In the area where fruit was destroyed they also bore the total cost of pruning, spraying, pulling of fruit, band inspection, etc., paying in addition to the owner $1.25 per box, orchard-run, on the estimated output.

It is gratifying to report that no sign of codling-moth has shown up this year in the Vernon Town area. In the Okanagan Landing section there has been a very decided decrease in captures over the season of 1919, being 70 per cent. decrease. The control-work in general has progressed in a very satisfactory manner.

The one unfortunate incident in the season's operations was the discovery in late October of a new infestation on the east side of Swan Lake, 6 to 7 miles north of Vernon, in the opposite direction to the old infestation of Okanagan Landing.

An area of 55 acres is known to be infested; on this a provisional quarantine was placed. All fruit still unshipped was inspected, specimens suspected of containing worms being culled out for dissection; all culls and windfalls in the orchard were then gathered and destroyed under the regular control measures. Altogether forty-eight worms were taken in this area.

The windfalls on 300 acres adjoining were inspected to the best of our ability. Though no actual captures of codling material were made, a number of suspicious specimens were gathered; this fact must be borne in mind in framing 1921 operations, on account of the infestation being on the edge of the B.X. Orchard section, containing over 1,000 acres of commercial orchard.

We feel justified in assuming the source of this new infestation to be from infested foreign refrigerator-cars in transit, the orchard in question being on the track side.

Inspection of Foreign Refrigerator-cars.

Between the dates of July 15th and October 31st your staff cleaned out and destroyed all refuse from 181 foreign refrigerator-cars. The interior of these cars was inspected and records kept of condition; the results of codling-moth material captured being 36 larvæ and 11 pupæ; total, 47.

Spraying.

Dates of Application.—First, May 28th to June 14th; second, June 26th to July 7th; third, August 8th to August 20th.

On the infested area three applications of spray were given, the contiguous uninfested area receiving two applications.

Number of trees sprayed approximated 11,500; number of trees banded and bands inspected, 12,500; number of boxes of fruit inspected before shipment, 4,077.

Inspection of Bands and Fruit—Dates and Material taken.

Area A, Okanagan Landing.

Orchard-owner.	Fruit and Band Inspections.						Larvæ.	Pupæ.
	1st, July 19 to Aug. 3.	2nd, Aug. 9 to Aug. 26.	3rd, Sept. 4 to Sept. 18.	4th, Sept. 20 to Sept. 30.	5th, Oct. 2 to Oct. 20.	6th, Nov. 5 to Nov. 23.		
G. Mickleborough	1L.	....	9L.	....	2L.	....	12	..
"	2P.	....	....	....	....	....	..	2
J. Mutrie	1L.	....	....	8L.	....	....	9	..
"	1P.	7P.	....	4P.	....	....	..	12
J. Wylie	4L.	3L.	....	4L.	4L.	3L.	18	..
"	2P.	4P.	....	5P.	....	....	..	11
H. B. Smart	....	4L.	3L.	....	1L.	....	8	..
H. Card	....	4L.	....	....	....	....	4	..
Totals	....	....	....	....	....	....	51	25

Worms captured in fruit by periods—

	Larvæ.
August 9th to 26th	4
September 20th to 30th	5
October 20th to November 23rd	2
Total	11

Deducting the eleven worms taken from the fruit from the total captures leaves the table as follows:—

	Larvæ.	Pupæ.
Captured in bands	40	25
Captured in fruit	11	..
Totals	51	25

Comparisons and percentages, 1919–20—	
Okanagan Landing captures, 1919	257
Vernon Town, 1919	116
Total	373
Okanagan Landing captures, 1920	70
Vernon Town, 1920	*Nil.*
Percentage of decrease, 1920, over 1919 decrease—	Per Cent.
Okanagan Landing area	70.44
Vernon Town area	100.00
Average decrease of all treated areas	79.90
New infestation, Swan Lake—	
Actual captures from fruit	48 larvæ.
Number destroyed by cooming, unknown.	

GROSS COST TO DEPARTMENT OF AGRICULTURE.

Spraying—		
Arsenate of lead, 1,030 lb. powder		$ 343 50
Black Leaf No. 40, 70 lb.		91 00
Supplies, materials, and repairs		261 46
Gas and oil		76 35
New spray-machine		559 59
Freight, express, and customs		264 00
Assistant Inspector's salary for 8 months at $120		960 00
Man-labour, 140 days at $4.50		630 00
Man and team labour, 32 days 7¾ hours at $9		359 75
Storage of machines		22 00
		$3,567 65
Cost to growers (chargeable through Department)—		
Arsenate of lead, 904 lb. at 35c.	$316 40	
B.L. No. 40, 68 lb.	89 92	
Man and team labour, 24 days 1½ hours at $9 per day	217 50	
Man-labour, 13 hours at 45c.	6 50	
	$630 32	
Band and fruit inspections—		
Materials and supplies		$ 51 30
Labour, 1 man, 467 days at $4.50		2,101 50
Foreign-car inspection—		
Flash-lights and batteries		6 35
Labour, 1 man, 30 days at $4.50		135 00
Eight months' expenses in car for transportation of men		197 13
		$6,058 93
Gross cost to Department of Agriculture	$6,058 93	
Less cost to growers, collectable	630 32	
	$5,428 61	
Compensation paid to city lot-holders	1,620 75	
Net cost to Department of Agriculture	$7,049 36	

SUMMARY AND RECOMMENDATIONS.

On account of higher wages, cost of material, new spray-machine, extra officer, salary and expenses, and compensation to city lot-owners, the costs of codling-moth control in the Vernon areas for 1920 were far in excess of the year 1919. In our opinion this extra expense has been easily justified by the results obtained, as shown by the table of results and comparisons.

The number of foreign cars taken care of was but half of the number inspected during 1919. The Department officials carried out all work in connection with cleaning and inspection.

For your consideration in planning operations and expenditures for the season 1921 in the Vernon District areas, we beg to suggest the following recommendations:—

Vernon Town Area.—Spraying and banding of trees, with necessary inspections; extending spraying operations north of the actual quarantine area; destruction of blossoms and fruit within the quarantine area.

Okanagan Landing and South Vernon.—Operations to duplicate those of 1919, with one exception—viz., in the contiguous area of South Vernon apply the calyx spray only and carry on usual band-work.

Swan Lake Section.—On the 55 acres known to be infested apply usual quarantine measures, map out a contiguous area under provisional quarantine, and apply usual methods of control with least restriction to owners' operations until actual infestation is established.

Endeavour to establish solution of the foreign refrigerator-car situation; as proven by the new outbreak at Swan Lake in 1919, these cars in transit are responsible; every effort should be made to have cars superheated to destroy all codling material within the cars, or clean, inspect, and ice all cars. Whichever method is adopted, the work should be carried out at main-line points and before cars are allowed to enter the valley fruit sections.

The problem of the destruction of culls and windfalls on infested areas is somewhat difficult. Under the Horticultural Regulations the owner is held responsible for this phase of the control measures. In practice the plan is not satisfactory. In lieu of this clause we would suggest that the Department undertake all work in connection with the destruction of windfalls, either bearing the cost themselves or charging same back to the grower.

The writer hereby desires to express his thanks for the assistance of the members of the local Entomological Branch throughout the year in breeding, classifying, and mounting material brought in from the field and for the photographic work carried out, all of which has enabled us to obtain more valuable records.

All of which is respectfully submitted.

H. H. EVANS,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SALMON ARM AND CANADIAN PACIFIC RAILWAY MAIN LINE DISTRICTS.

C. R. BARLOW.

W. T. Hunter,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith my annual report of work in my district for the year 1920.

FIELD-WORK—PEST-CONTROL.

Apple-tree Anthracnose.—This disease is still making headway in some orchards. The owners of most of the affected orchards intended to spray with Bordeaux mixture this fall, but unfortunately few were able to do so, as the continued wet weather so delayed picking that every fine day had to be devoted to harvesting the crop. However, with average weather conditions prevailing next fall, your Inspector should have no difficulty in getting the disease under control.

Apple-scab.—Owing to the dry season, and also to more careful attention to spraying by the growers, the percentage of scab in the fruit was not as great as usual.

Fire-blight.—Fire-blight is present in the Salmon Arm and Sorrento Districts. An outbreak occurred in some of the orchards in the Lake Shore Section at Salmon Arm, chiefly among Wealthy and Spitzenberg, but, thanks to the excellent co-operation of the owners, was quickly brought under control. An inspection for hold-over cankers will be made during the winter.

San Jose Scale.—San Jose scale still persists in some isolated patches of brush at Spences Bridge. The orchards adjacent have up to the present remained free from the scale, and by

the occasional use of lime-sulphur as a dormant spray, coupled with the cutting and burning-over of the infested brush each spring, any infestation of these orchards can probably be prevented. This will entail a certain amount of expense to the grower, but from the nature of the ground on which the brush is growing it is almost impossible to completely eradicate the scale.

Grasshoppers.—In the fall of 1919 considerable damage was caused by grasshoppers at Celista, on the north shore of Shuswap Lake. E. R. Buckell, of the Entomological Branch, and your Inspector visited the infested area; and although a large percentage of the hoppers were parasitized, arrangements were made to attempt control should the outbreak recur this season. Accordingly, the necessary material for poisoned bait was shipped to Celista this summer, but owing partly to adverse weather conditions and partly to increased parasitization the hoppers did not appear in such numbers as to menace the crops and it was unnecessary to use the bait.

Grasshoppers in large numbers were this summer observed by your assistant about two miles east of Notch Hill. It is possible that these may increase to such an extent as to cause serious damage to crops next year.

Pear-leaf Blister-mite.—This pest has increased rapidly in the Salmon Arm and Sorrento Districts during the past season. An article dealing with its control has been published in the local newspaper by your assistant and an effort will be made to control the pest in the spring.

Codling-moth.—Although during the years 1918 and 1919 no indication of the presence of codling-moth was found on the quarantined area at Walhachin, it was decided to check up the previous work by continuing the band inspection and examination of fruit again this year. The bands were accordingly inspected three times; no larvæ or pupæ were found until the third inspection on October 11th, when four larvæ were found spun up on the trunks of two trees, but not on the trees adjacent to the old area of infestation. Since that time three more larvæ have been found on the same trees. Nothing was found in the examination of the fruit. The location of the trees upon which the larvæ were found was half a mile from the nearest tree upon which larvæ were found in 1917, but only 25 yards from the Canadian Pacific Railway tracks and 80 yards from the Canadian Pacific Railway freight-sheds.

This shows very clearly that the worms found this season are those of a new infestation which has occurred in close proximity to the Canadian Pacific Railway tracks, and that the infestation is due to cars which were harbouring the codling larvæ being left on the sidings and from which moths have escaped into the orchards near by. A rough plan showing the location of these trees will be found appended.

It will be necessary to adopt control measures next spring, recommendations for which are also appended.

Experimental Work.

Spraying Experiments.—The experimental work on apple-scab control was carried on again this year at Salmon Arm. The object of this work was explained in last year's report. This is the second season that these experiments have been conducted.

An additional plot was added this year to try out a home-made lime-sulphur solution manufactured by the Salmon Arm Farmers' Exchange. The results, as will be seen from the appended table, show very little variation from those of last year, being satisfactory on all plots, including that on which the home-made spray was used. The season, however, was exceptionally dry; consequently the amount of scab present on the check-plot was below the average; therefore these results should not be taken as a criterion of what would happen should an average or wet season occur. The work should be carried on for another season or until a season occurs in which the precipitation is normal. Should these experiments prove as successful as results up to the present would indicate, growers will be able to effect a considerable saving in the cost of their scab-control operations.

Cover-crop Demonstrations.—With the object of demonstrating the value of cover-crops as a factor in soil-improvement, five plots, varying from one-fifth to one acre in size, were seeded to hairy-vetch this fall at Salmon Arm. The soils are in bearing orchards and on soils varying from gravelly loam to heavy clay loam. Three of the plots are in the same orchard and on the same type of soil, and a variation in the rate of seeding has been made in each plot, the rates being 25 lb., 30 lb., and 40 lb. to the acre respectively. The object of this variation is to determine the minimum quantity of seed with which a satisfactory stand can be obtained. The wet weather this fall was favourable to germination and a good catch was obtained on all plots.

It will be necessary to carry on this work for three years, a check being kept on the yields and terminal growth of the trees as compared with the check-plots.

Liming Experiments.—These experiments were started in the fall of 1918 and three plots were laid out, two on clay loam soils and one on a sandy loam. Three tons of hydrated lime per acre was applied. All plots were on bench land. Two abnormally dry seasons have followed the application of the lime. On Plot 1 alfalfa was seeded with a nurse-crop of oats, and on Plots 2 and 3 red clover was used.

On Plot 1 the physical condition of the soil shows considerable improvement over the check-plot, also the nurse-crop (oats) gave an increased yield; but only a slight improvement could be noted in the alfalfa the first year. Last winter, owing to the severe weather in the fall, at a time when there was no protective covering of snow, the young alfalfa-plants were almost entirely killed out on both limed and check plots.

On Plot 2 red clover was used. Here the improved physical condition of the soil was very noticeable. The catch of clover was considerably thicker on the limed plot than on the check-plot, but owing to drought conditions in 1919, and again this year, the plot failed to put up a stand worth cutting.

On Plot 3 red clover was seeded in the spring of 1919 and came up well, but was entirely killed out by frost, the same conditions prevailing as those which killed out the alfalfa on Plot 1.

These results are unsatisfactory, as in your assistant's opinion they are neither negative nor affirmative so far as the value of lime is concerned. The weather conditions prevailing since the experiments were started have been very unfavourable to the action of the lime, as the land has been excessively dry. This factor would not only delay the action of the lime, but would adversely affect the growth of the plants, even assuming that some action from the application of the lime had occurred. A still more unfortunate factor was the severe freeze last fall, which killed out the alfalfa on Plot 1 and the hairy vetch on Plot 3.

In view of these facts your assistant would suggest that the experiments be carried out until results, either negative or affirmative, are secured. Suggestions regarding this matter will be found in appended form.

Meetings.

Your assistant attended five meetings of the Salmon Arm Agricultural Association and acted as Vice-President of the association; four meetings of the local branch of the British Columbia Fruit-growers' Association, of which he was Secretary; and eight meetings of the Board of Directors of the Salmon Arm Farmers' Exchange.

Pruning Demonstrations and Pruning-school Work.

Forty-seven pruning and grafting demonstrations were given to growers requesting same in the Salmon Arm, Sorrento, and Kamloops Districts.

A pruning-school was held at Sorrento in February, with eight pupils attending. Nine lessons in pruning and one in grafting were given. A separate report thereon has been previously submitted.

Field Inspection.

General field inspection has been carried out and a great number of personal visits to growers have been made during the season for the purpose of discussing their various problems. This phase of the work takes up a large portion of your assistant's time.

Fall Fairs.

Your assistant acted as judge of fruit, vegetables, and field-crop sections at the following fall fairs: Kamloops, Smithers, Terrace, and Prince Rupert. A full report thereon has been submitted.

City-garden Competition.

At the request of the Kamloops Garden Club your assistant acted as judge of a city-garden competition organized by the club in the City of Kamloops. There were forty-two entries in the competition and many of the gardens were fine examples of what can be achieved in the horticultural line on a city lot.

Newspaper Articles.

Short articles dealing with various horticultural subjects have been contributed by your assistant to the local newspaper, also one to the British Columbia Fruit-growers' Association monthly bulletin.

Office-work.

The demand made by this branch of the work on your assistant's time is considerable and is increasing. The amount of correspondence has increased a great deal during the past year, and coupled with the ordinary office routine work and numerous interviews with growers, makes it very difficult at times to keep other branches of work up to date.

Orchard and Small-fruit Acreage Survey.

A survey of the orchard and small-fruit acreages throughout the district was made by your assistant during November and December and much useful data obtained.

General Conditions.

The fruit and small-fruit crops were considerably below normal; the quality was good on the whole and the prices obtained were excellent. No doubt the severe freeze last fall, coupled with drought conditions the past summer, was largely responsible for the small crop. This fall conditions have been very favourable, the trees have matured well, and there is abundant moisture in the ground. Present indications give promise of a heavy crop next year. The vegetable-crop was average; considerable second growth occurred in potatoes in the Salmon Arm District, due to the long period of drought, followed by heavy rainfall early in the fall. The prices received for vegetables were fair as a whole, but in some lines were not very satisfactory to the grower.

All of which is respectfully submitted.

C. R. Barlow,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, KELOWNA.

T. M. Anderson.

W. T. Hunter,
District Horticulturist, Vernon, B.C.

Sir,—I beg to submit herewith my annual report as District Field Inspector for the Kelowna District for the year 1920.

Field-work—Pest-control.

Fire-blight.—Up to the month of August this disease was very quiescent in the whole of the Kelowna District. However, during the month of September heavy rains fell and fire-blight unfortunately became very active. This was particularly noticeable in young pear-trees that had made abnormal growth during the early part of the season. Growers are paying very strict attention to the elimination of this disease and in many cases are pulling out those varieties that are particularly susceptible. Your Inspector, under instructions, has distributed a large number of the new regulations in the "Horticultural Act" *re* fire-blight.

Woolly Aphis.—The woolly aphis has become generally distributed throughout the district. No systematic control measures have been adopted for the eradication of this pest. Your Inspector has visited many orchards where this insect has been troublesome and has given advice to the growers regarding its control. Bulletin No. 34, "The Woolly Aphis of the Apple," has been distributed.

Codling-moth.—During the latter part of October a larvæ resembling the codling-moth was found in this district. This was sent to the Vernon office, but was found to be too immature for positive identification when submitted. Our suspicions of an infestation were aroused and we were advised to make a thorough survey of the locality from which this particular larvæ came. After a considerable amount of work an infestation was actually found in an area comprising three orchards situated on the north side of Kelowna; that area which had been under quaran-

tine during 1914–16. About 100 larvæ were taken altogether, some of which were sent to the Vernon office while the remainder were destroyed. Owing to the lateness of the season no further work could be carried out until the opening of spring, when the infested area will be placed under quarantine. It is difficult to decide whether this is a new infestation or a hold-over from that of the infestation of 1914–16. The accompanying diagram shows the relative location of the infested area to that of the freight-car depot.

Vegetable Insects.—The onion-maggot has been very troublesome where no control measures were adopted. However, the control method as outlined by R. C. Treherne, Dominion Entomologist—i.e., the volunteer row—proved very successful. In some cases several hundreds of eggs of the onion-maggot were taken from a single plant in the volunteer or "trap" row. Growers will be strongly urged the coming season to adopt this method of control.

Cover-crop Experiments.

In order to demonstrate the methods of building our orchard soils the Horticultural Branch of the Department of Agriculture has undertaken to establish cover-crop experimental plots in a few orchards of this district. Already two such demonstration plots have been sown, using hairy vetch and sweet clover respectively. These plots are on the K.L.O. Benches, each containing 4 acres—the vetch sown at the rate of 20 lb. per acre and the clover at the rate of 8 lb. per acre. As these plots were sown in September of this year, no data is yet available.

It is the intention of the Department to take this work up more extensively and to put in further demonstration plots during the coming year. The object of these demonstrations is to secure accurate data on the soil-improvement value of hairy vetch and sweet clover and to compare the costs of different orchard practices.

Considerable interest was aroused during the past season among the Kelowna orchardists by reports coming to hand of the methods of soil-improvement as practised by our neighbours in the apple-growing district of Wenatchee. Many arguments were advanced regarding the advisability of seeding orchards to a permanent alfalfa-sod mulch, as is practised in the Wenatchee District. To study these methods at first hand the Horticultural Branch of the Department of Agriculture organized parties to visit Wenatchee during the month of August. Altogether four parties, comprising ten orchardists in all, left Kelowna on this visit and a considerable number more expressed themselves as being very anxious to make the trip, but regretted that they were unable to do so on account of the picking season having started. Your Inspector had the privilege of conducting the first party. The following are a few of the impressions gathered when driving around the Wenatchee District:—

What impressed one most was the fact that the trees were carrying a much bigger crop of better-sized apples than was to be found in our own district. The foliage of the trees was heavy and of a dark-green colour. It was also particularly noticeable that most of the orchards were sown to a permanent alfalfa-sod mulch. On inquiry, however, it was found that this cover-crop could only be obtained if the orchardist could rely on an abundant supply of water. In the consistently heavy-producing orchards it was found that no hay had been taken off and that leaving the alfalfa entirely alone from year to year gave the best results. Some of the orchardists use heavy applications of fertilizer, while others maintain that the alfalfa, which is very vigorous, will supply all the plant-food necessary to the orchard in the future, with perhaps light applications of fertilizer from time to time.

Much valuable data was also gathered *re* the irrigation system used and other matters, and all of the orchardists who made the trip returned satisfied that the visit had been not only a pleasant but also a most instructive one.

Pruning Classes.

Two pruning classes were held during the month of February, with Mr. Chesbro as Instructor, twenty-two pupils in all taking the full course of five days. One class was held in the month of November, with M. S. Middleton as Instructor, ten pupils taking the full course.

Over fifty applications have been received from new settlers and returned men for instruction in pruning-work. It is proposed that other pruning classes be organized for the early part of 1921. The value of this instruction is being realized more and more as the young orchards develop and growers realize the importance of starting and training the trees correctly. The class instruction also results in a uniformly improved system of pruning being followed throughout the orchards of the district.

Fall Fairs.

Fall fairs were attended in the capacity of judge at Kelowna and Salmon Arm. A separate report of each fair has been submitted to the Department.

At the request of the Soil and Crop Division your Inspector acted as judge, while attending the Salmon Arm Fair, in the boys' and girls' corn-growing competition at Silver Creek. A report of same was submitted to the Department.

Your Inspector also acted as judge, in conjunction with J. E. Britton, District Agriculturist, in the corn-growing competition for the Bankhead challenge cup in the District of Kelowna.

Orchard-survey.

Your Inspector, assisted by R. E. Seeley, has completed an orchard-survey of the whole of the Kelowna District. A complete record of each orchard, giving name of owner, person in charge, location in district, total acreage of ranch, acreage in orchard, arable fruit land, small fruits, vegetables, field crops and waste land, kind of soil, care and condition, valuation, kinds of fruit, varieties, number of each, and age, was taken and compiled. This information will be of great value not only to the Department and the public, but also for statistical purposes.

Crop Reports and Fruit-pack Inspection.

Crop estimates and reports have been made from time to time during the season, and at the end of the year a detailed report has been made and submitted to the Department of the fruits and vegetables passing through the different packing-houses and canneries.

Fruit-pack inspection has also taken place as usual from time to time during the season and certificates issued on foreign shipments when requested.

Fruit and Vegetable Production.

The orchardists of the Kelowna District have passed through a rather disappointing season. Weather conditions were favourable, but the crop was very light. Only about 45 per cent. of the 1919 crop was realized. Fruit, however, kept well up to the average in quality and prices remained high.

Over 600 acres of onions were grown in the past season in this district. Crops were well up to the average, but, wet weather setting in, very large quantities were left on the ground and were not well harvested, some being a total loss. The market, too, went against the onion-grower and there is about 50 per cent. of the crop still unmarketed.

The tomato-crop was disappointing. The crop was heavy, but due to weather conditions was too late in ripening, and a large percentage of the crop was spoiled by the unusually heavy fall rains. It is felt that if the ripening period could be hastened or advanced that this crop would be greatly enhanced in value to the district.

Field-inspection Work.

General field-inspection work was carried out during the year and many hundreds of visits were made. Many calls were received from new settlers and also from men taking up land under the Soldier Settlement Board.

Office-work.

The office of the Department of Agriculture in Kelowna is situated on the main street, a few steps from the Canadian Pacific Railway passenger-wharf. Visitors and prospective settlers in the district find it convenient to call for information and advice. The building is also the headquarters for all the farmers' meetings held in Kelowna, and as far as possible the office is made a place where farmers may call at any time, and many avail themselves of this privilege. Almost every day numerous calls have been made upon the office staff for information regarding fruit pests, soil-treatment, fertilizers, live stock, orchard-work, etc. A great many bulletins on the various topics have been distributed where they will be used to advantage.

The amount of office space was found to be entirely inadequate and in November arrangements were completed whereby the office has been enlarged to about twice the former size.

All of which is respectfully submitted.

T. M. Anderson,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SUMMERLAND.

J. TAIT.

W. T. Hunter,
District Horticulturist, Vernon, B.C.

SIR,—I beg to submit herewith my annual report as District Field Inspector for the Summerland, Peachland, Naramata, and Westbank Districts for the year 1920.

Fruit and vegetable shipments, although not quite as heavy as last year, were considerable and entailed the usual inspection at point of shipment in the evenings. With few exceptions, the quality of fruit sent out was up to standard. No wormy fruit was allowed to pass your Inspector and be shipped.

Frequent visits were made to the various packing-houses during the packing and shipping season in search for new pests and diseases.

FIELD-WORK—PEST-CONTROL.

Codling-moth.—The work in codling-moth control at Westbank was carried on along former lines—two sprayings and five band inspections—no larvæ being found this past season.

Blister-mite.—Summerland District has been infested with blister-mite on the apple and some pears for the past three years. Your Inspector has endeavoured to have growers spray for this pest. The degree of success has varied with the individual. A spraying experiment was conducted by your Inspector to control this pest and some useful data was obtained for next season. Blister-mite has also shown up in Peachland orchards during the season.

Fire-blight.—Fire-blight was carefully cleaned up during pruning operations last winter, clearly demonstrating that this disease can be at least reduced to a minimum by careful attention to it in the proper season. Very little twig-blight was in evidence this year.

Powdery Mildew.—This disease was not serious in this district this season.

COVER-CROP EXPERIMENTS.

With the co-operation of two orchardists, three-year cover-crop demonstrations with hairy vetch and sweet clover will be carefully tried out. Vetches have already been sown and have made splendid growth.

Experiments are also to be conducted in orchards where alfalfa is already established, and results noted as to the best methods to be practised with regard to alfalfa-sod mulch and amount of water which is required.

FALL FAIRS.

Your Inspector assisted in the judging of fruit, vegetables, and grains at Whonnock Fall Fair; exhibits of insect pests and plant-diseases at Salmon Arm, Peachland, and Naramata Fall Fairs were conducted.

PRUNING CLASSES.

Your Inspector conducted pruning classes at Kaleden and Cawston during February; concluding each class with a demonstration in budding and grafting and general orchard topics, assisted by W. T. Hunter, District Horticulturist, Vernon. Separate reports thereon have been forwarded to the Department.

MEETINGS.

Your Inspector attended the following meetings: Opened the discussion on spraying at a meeting of the Summerland Farmers' Institute; opened the discussion on budding and grafting at a meeting of the United Farmers, Trout Creek. Attended the British Columbia Fruit-growers' Convention at Vernon in January; also the Convention of the Western Horticulturists at Vernon in August. Made special arrangements for fruit-growers' meetings in Summerland and Peachland. R. H. Helmer, of the Dominion Experimental Farm, Summerland, and W. T. Hunter, District Horticulturist, Vernon, attended and gave very interesting and helpful talks on "Cover-crops and Soil-fertility."

General.

During the year the following officials were shown over the District: W. J. Sheppard, Foulbrood Inspector; C. Tice, Soil and Crop Instructor; A. McMeans, Dominion Seed Specialist; J. Travis, United Seed Growers; W. T. Hunter, District Horticulturist, R. C. Treherne, Dominion Entomologist in Charge for British Columbia.

The general condition of the orchards in this district is above the average. The splendid fall rains helped considerably to put the soil in fine condition for wintering. The growth during the year was good and buds seem to be well developed. Prospects appear to be excellent for a large crop in 1921.

All of which is respectfully submitted.

John Tait,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SOUTHERN OKANAGAN AND SIMILKAMEEN DISTRICTS.

A. J. Mann.

W. T. Hunter,
District Horticulturist, Vernon, B.C.

Sir,—I herewith beg to report as District Field Inspector for the Southern Okanagan and Similkameen Districts from April 7th to December 31st, 1920.

Horticultural Conditions.

Prolonged cold, backward weather last spring, accompanied with frosts during the blooming and fruit-setting period, resulted in a considerable reduction in the yield of fruit this season as compared with 1919. This, however, was no doubt a blessing in disguise, for a higher grade of fruit was obtained, particularly in those orchards where "thinning" was not intelligently practised; also prevented many trees from overbearing at a time when many orchardists could least afford it. Growing conditions were very favourable throughout the summer and autumn, and where proper, modern irrigation and cultural methods were practised very fair returns were obtained. The unusual autumn rains in the Okanagan this year provided very favourable growing conditions for the numerous cover-crops throughout the district. The same have made excellent growth, and fortunate indeed were those fruit-growers who availed themselves of this system of improving the nitrogen and humus content of the soil. Taking advantage of the mild open weather of November and December, many growers accomplished considerable pruning, ploughing, and general orchard-renovation work. Fruit-trees in general have entered the winter in excellent condition and present indications give promise of a large crop next year.

Injurious Insects and Diseases of the Season.

Blister-mite.—Very severe infestations exist in small areas on apple-trees in the Fairview, Kaleden, and Keremeos Districts. Although not very numerous on the Dog Lake and Penticton Benches, nevertheless extremely careful observation for this pest is urged, particularly in orchards where the dormant lime-sulphur spray 1–9 is not applied. A determined united effort is needed this spring to combat this important insect by very thorough spraying at high pressure with lime-sulphur 1–9 strength as near to but before the buds have opened.

Woolly Aphis.—Like the blister-mite, this insect is well established in small areas throughout the entire district, particularly at Keremeos, Kaleden, and the lowlands of Penticton. During the late summer and on to the end of November considerable effective work was accomplished in combating this pest. Prompt and thorough eradication methods are urged whenever this insect makes its appearance to prevent it spreading, particularly to the tree-roots, where control measures are rendered costly and difficult.

Cherry and Pear Slug.—This insect, although not difficult to control, caused considerable damage this summer and autumn to pear and cherry trees, particularly in orchards where spraying was neglected. The trees in one pear-orchard were completely defoliated, thus not

only damaging the trees for this season, but weakening them for next year. In another orchard (cherry) a large portion of the fruit was rendered unfit for market.

Peach-twig Borer.—Very little financial loss was caused by this insect this season, and where intelligent spraying was practised it barely made an appearance. Careful inspection of apricot and peach shipments were made throughout the shipping season for this pest.

Peach-root Borer.—This great enemy of the peach-tree is well under control. Very little trouble was experienced except in badly neglected orchards.

Fire-blight.—With the exception of a few minor outbreaks in the Penticton District, this important bacterial disease caused very little trouble this season. However, persistent, thorough inspection and prompt control measures are continually required. Your Inspector endeavoured to keep in close touch with the blight-infested orchards and rendered all possible assistance.

Powdery Mildew of the Apple.—Although not as prevalent as last year, this fungous disease continues to give considerable trouble, particularly in Penticton District, on the Jonathan variety. Very close observations were made on the results of spraying as recommended by the Department, and although complete eradication was not obtained the results were very encouraging.

Western Tomato-blight.—A close inspection was maintained for this disease at Cawston and Keremeos. Slight outbreaks occurred, but the damage done in infested fields would probably run under 5 per cent. There appears to be no known remedy for this disease. Typical diseased plants were forwarded to J. W. Eastham, Provincial Plant Pathologist, Vancouver, for further investigational work. Careful plant-selection and improved cultural and irrigation methods would probably reduce the susceptibility of the tomato-plant to the ravages of this disease.

Drought-spot.—This physiological spot disease of the apple, although not widely disseminated, caused considerable trouble this year. It is not contagious and does not "spread" from one tree to another. The disease may occur at almost any stage in the development of the apple, but the fruit appears to be more susceptible after it is one-third grown. Severely attacked fruits were rendered unfit for market purposes. Affected trees were usually located on light, shallow soils where improper and insufficient irrigation prevailed. The probable control measures for drought-spot are the conservation and even distribution of the soil-moisture supply throughout the season and the improving of the water-holding capacity and physical condition of the soil by the addition of humus.

Infestations of other insect pests and diseases were about normal, and with the exception of a few orchards severely attacked with blister-mite the district in general passed through a very successful season.

EXHIBITION-WORK.

The following fall fairs were attended and assistance given in the judging of grain, fruit, and vegetables: Kamloops, Penticton, Peachland, and Naramata. The Department, in conjunction with the Dominion Entomological Branch of Vernon, conducted an information booth at the last three named places. Typical mounted specimens of injurious and beneficial insects and plant-diseases common to the district, with brief remarks attached, were shown. General agricultural bulletins were freely distributed. These information booths were much appreciated by the public and should be encouraged.

AGRICULTURAL STATISTICS.

This work entailed considerable time during the latter part of the season. Practically every fruit-grower in the district was visited. Besides gathering the statistics for the orchard-survey, general horticultural problems were discussed which were always appreciated. The outstanding lesson learnt through this work is the great need of standardizing a simple efficient system of farm book-keeping.

GENERAL WORK.

Many requests came to the office from both new and old fruit growers for personal visits to their orchards and for general horticultural advice. All visitors seeking agricultural aid and horticultural information and all correspondence were given careful consideration.

All of which is respectfully submitted.

A. J. MANN,
District Field Inspector.

REPORT OF DISTRICT AGRICULTURIST AND FIELD INSPECTOR, GRAND FORKS.

Paul C. Black, A.O.A.C.

E. C. Hunt,

Assistant Horticulturist, Nelson, B.C.

Sir,—Herewith is submitted a report of work done in the Grand Forks District by your Inspector from July 1st, 1920, to December 31st, 1920.

Orchard-survey.

A careful survey has been made of all the orchards in the district. Upon comparison with a similar survey made in 1916 it was found that the acreage had very considerably decreased. A large number of fruit-trees have died and been taken out, chiefly as a result of lack of moisture. This has been particularly the case in the Rock Creek and Midway sections in the western end of the district, more especially on the valley lands where irrigation is essential to successful fruit-growing. Those orchards on the bench lands which have received reasonable care and attention have done very well. From the necessarily limited opportunity for observation, your Inspector is of the opinion that the Rock Creek and Midway section is generally better adapted to mixed farming than to commercial orcharding.

Only a very limited number of young trees have been planted out during recent years in the Grand Forks District, the orchardists preferring to wait the advent of irrigation. At the present writing the prospect for an early installation of a comprehensive irrigation system covering the major portion of the district looks most promising.

Potato and Vegetable Survey.

A survey was also made of the potato and other field crops. Quite an extensive acreage is devoted to potatoes in the Grand Forks District; the soil, being generally of a loamy character with a greater or less admixture of sand, is well suited to growing tubers of superior quality. Field roots also do exceedingly well. Owing to the dry weather during July and the early part of August the outlook for potatoes and hoed crops was very poor, and many fields looked as though they would hardly be worth harvesting. But the crop was saved by timely rains during the latter half of August and the early part of September, with the result that there was a fair yield generally. The potato-crop, however, was harvested in a more or less unripened condition, the growth having been prolonged late in the season owing to the abundant fall rains.

Diseases and Insect Pests.

The orchards and field crops of the district are singularly free from diseases and insect pests, but not entirely so.

Fire-blight.—A severe attack of this serious disease occurred some three or four years ago, but the prompt and efficient measures adopted by officials of the Department of Agriculture at that time were successful in almost completely eradicating it. This season, however, there have been a few incipient outbreaks, and your Inspector has at once notified the owners of the orchards where blight has appeared, and they have agreed to cut out all infection during the dormant season. A close watch will be kept for any reappearance of the disease this coming spring and summer.

Green Aphis.—A few instances of apple-trees affected by aphis were found and the owners advised of proper spray methods to destroy them.

Oyster-shell Scale.—There are a few scattered areas showing attacks of this insect, but only to a limited extent generally. One orchard, however, was found to be very badly affected. This orchard, which was planted some twenty years or more ago, had been very much neglected. The owner intends destroying a number of trees which are in very bad condition and has agreed to clean up the remainder.

Flat-headed Apple-tree Borer.—A block of young trees set this past spring was attacked by flat-headed borer, but the injury was not noticed until fully 25 per cent. of the trees had been destroyed. These pests had evidently migrated from an adjoining orchard which has been badly neglected for a number of years. The non-resident owner of this orchard was notified of its condition and has promised to have it looked after.

Frost-injury.—A number of orchards in certain localities were severely hit by frost at the time the fruit was setting last spring, with the result that a large proportion of the apples in these orchards was badly "russeted."

Potato-scab and Blight.—A small amount of common potato-scab and a few isolated cases of late blight were noted, but the crops on the whole were very clean and free from disease. Application of the Bordeaux spray (6–4–40) was advised for late blight. Treatment of seed-potatoes for scab (usually with formalin) is the general practice in this district.

Inspection of Nursery Stock.

All nursery stock grown for shipment this season at the Riverside Nurseries, situated 2½ miles east of Grand Forks City, was inspected, both in the nursery rows and after being dug and stored in the cellars. The stock at this nursery, while having made only a fair growth this past dry season, was found to be comparatively clean; the only trouble found being a certain proportion of the roots affected with crown-gall, root-gall, etc. All infected stock was discarded. A detailed report of this inspection has been submitted to the Department.

Crop Reports.

All available data relative to the past season's production of fruit, potatoes, and vegetables was collected and a report submitted to the Department. The apple-crop for this district was very light—hardly 50 per cent. of an average yield, and the quality poor; there being a large proportion of No. 3's and culls.

Pears, of which not many are grown as yet, were a good crop. Stone-fruits were a very light yield, prunes especially being very poor.

The shipping and marketing conditions for the season have been most unsatisfactory. There was very much to be desired in the method of handling the fruit in the packing-houses, there being in some instances a regrettable lack of system and care in packing.

Office-work.

Most of your Inspector's time up to the latter part of November has been spent in visiting the different orchards and farms in the district, and consequently very little opportunity has been had for work in the office. Quite a number of property transfers have occurred during the past few months and numerous inquiries for advice in orchard and field work have been received from new-comers to the district.

Respectfully submitted.

Paul C. Black,
District Agriculturist and Field Inspector.

REPORT OF DISTRICT AGRICULTURIST AND FIELD INSPECTOR, CRESTON.

C. B. Twigg, B.S.A.

E. C. Hunt,
Assistant Horticulturist, Nelson, B.C.

Sir,—I herewith beg to submit my annual report as District Agriculturist and Field Inspector for East Kootenay and that portion of West Kootenay south of Kootenay Lake for the year 1920.

Pruning-schools.

Pruning-schools were conducted by your assistant in early spring at Vallican and Nakusp, in West Kootenay, and a separate report of each was forwarded to your office at the close of the school.

Lectures.

The returned soldiers at Lister, who are taking up unimproved farms and clearing them under the supervision of the Soldier Settlement Board, asked your assistant to address them occasionally at their monthly meetings in the school-house at the settlement during the winter months, and addresses were delivered on "Gardening," "Potatoes," and "Farm Topics" from a pioneer's point of view.

Field Inspection.

General field inspection was carried out throughout the season and the whole fruit-growing district was covered. Such pests as oyster-shell scale, green aphis, bud-moth, and pear-slug or any of the leaf-eating larvæ of insects, when and where noticed, were pointed out to the grower, and if he was unacquainted with them further information regarding their control was given him. No pest, either fungous or insect-life, that is recognized as a serious menace to the welfare of the fruit-growing industry was found doing damage or brought to my notice. The only exception to this was one or two specimens of the larvæ of *Archips argyrospila* (the leaf-roller of the apple-tree) were found and forwarded to Mr. Treherne, the Dominion Entomologist at Vernon, who identified them. This has proved to become a serious pest in certain districts in the North-western States south of us, but has not increased in numbers here yet.

Fall Fairs.

Fall fairs were held at various points in the Kootenay, and your assistant acted as judge or assistant judge in the fruit and vegetable sections at Natal, Slocan City, New Denver, Athalmer, and Creston. A separate report on each of the above fairs, with marked prize-lists, has been submitted after the judging was completed.

Orchard-survey.

An orchard-survey of the fruit-growing district south of Kootenay Lake was completed in the fall after two months' work in the field, and the number and variety, if known, of trees planted were listed and the field-notes forwarded to your office. During the latter part of the year your assistant was engaged in making copies of the same in your office at Nelson.

New Settlers.

During the last year many new settlers have come into the valley, chiefly from the Prairie Provinces; those having money bought improved farms if possible; others obtained raw land. Wynndel, at Duck Creek, especially has received many such, and several 10-acre blocks are being cleared preparatory to planting out strawberries, etc., so that next season it is to be expected there will be additional acreage under crop. Throughout the pruning and spraying season much valuable assistance was given demonstrating in the orchards to new settlers, and the work and advice thus rendered was in every instance much appreciated and acted upon.

General.

The growers of this area have just experienced another dry summer, which followed the earliest and coldest snap of frost this district has experienced during any winter in its history of fruit-growing. There was no snow on the ground when the weather suddenly fell to a little below zero for a short period early in the fall of 1919. The frost went into the soil about 2 feet and did not thaw out until spring, incurring the loss of the winter's snowfall, which melted and ran off the surface. When spring cultivation was resumed it was found that the frost had killed more or less of the roots near the surface. Stone-fruits suffered more, especially peaches, and among the apples frost-injury was more apparent in the early varieties. The orchards developed full bloom and those injured shrivelled up, and if severely immediately, and your assistant was asked to look at several orchards where one or more of the trees were thus affected.

The late, wet spring helped to revive the orchards, but after the June drop it was found that the trees had set about 50 per cent. of a crop; this can be attributed to the dry state of the subsoil and to frost-injury. Apple-scab was prevalent on susceptible varieties where not sprayed. Early varieties showed many blemishes, chiefly due to drought-blister and cold weather after blooming.

The prospects for next season are very promising. There has been considerable precipitation this fall, and at the time of writing snow has made its appearance, in all probability to stay the winter before the advent of severe frosts, which will help to keep the soil from being frozen and protect the roots of the trees.

All of which is respectfully submitted.

C. B. Twigg,
District Agriculturist.

REPORT OF THE AGRICULTURAL REPRESENTATIVE, KELOWNA DISTRICT.

J. E. BRITTON.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit the following report for the year 1920:—

The Kelowna District comprises that area extending from Okanagan Centre to Okanagan Mission and Westbank. It takes in Duck Lake, Ellison, Rutland, Benvoulin, Belgo, Glenmore, K.L.O., and South Kelowna. There are in the district about 5,000 acres of tree-fruits.

In some sections mixed farming and dairying are of greatest importance, while other areas consider truck-crops the main feature. Considerable attention is now being given to small-fruit culture and a number of acres will be planted this year.

The Agricultural Representative was appointed to this district in September through the co-operation of the Departments of Education and Agriculture. Part time was to be devoted to the teaching of agriculture in the Kelowna High School and the balance to the conducting of district work.

The office, already established by the Fruit Branch, has been enlarged, renovated, and a desk and filing system installed. This office is situated in a building used by the farmers for their agricultural meetings held in Kelowna. The farmers generally make use of the office and many calls are made for information, bulletins, etc. It is proposed to extend this feature of service and to make the office a popular centre in Kelowna for all farmers.

The Agricultural Representative has endeavoured to become acquainted and familiar with the district as quickly as possible, and aims to meet the farmers out in the field as much as possible. Several important questions have come up in the various parts of the district; among them: Soil-fertility in orchards; use of lime and fertilizers; growing green manure crops; soil-treatment for truck-crops; handling seeds in seed production; silos and silo crops; small fruits, general; poultry, general. From these the work for the coming season is planned.

Certain projects are already under way to conduct demonstration plots in orchard-soil treatment, considering water, cover-crops, fertilizers, and lime.

There has been considerable demand from the locals of the United Farmers for the Representative to attend and address their meetings. Seven addresses have been given during the past two months and more calls will be made from the local organizations as they come to understand the work that is being promoted.

J. E. BRITTON,
Agricultural Representative.

REPORT OF AGRICULTURAL REPRESENTATIVE, DUNCAN.

W. M. FLEMING.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit for your consideration the following report of my work as Agricultural Representative at Duncan:—

This office was established under an agreement between the Department of Education and the Department of Agriculture, whereby, in addition to teaching of agriculture in the high school and maintaining general supervision of the teaching of nature-study and agriculture in the public schools of the Cowichan District, general district representative work should be carried on. The Department of Agriculture pays all office and travelling expenses in the district.

I was appointed to the position of District Supervisor of Agricultural Education at Duncan on January 1st, 1920. Shortly after assuming the position it was considered wise to move the office and a new office was opened up in the Agricultural Hall. This office is shared by the Secretary of the Agricultural Society. It is known as the Agricultural Office and is used generally by various farmers' organizations as a meeting-place.

A supply of bulletins from the Publications Branch is kept on display and these have been distributed widely as a result. Many callers visit the office every day for information and advice on every possible phase of agriculture. Time does not permit any attempt to cover the district by personal visits. By special request I have visited many farms and given advice on such subjects as soil-management, choice of crops, drainage plans, insect and plant diseases, etc.

The pure-bred-stock breeders have been organized into the Cowichan Stock-breeders' Association, whereby all the breeders co-operate in advertising and marketing their stock. I have acted as Secretary-Treasurer since its organization.

Special attention has been directed to the advantages of R.O.P. testing. This district now leads the Province in the number of herds under test and new names are added to the list as each new Inspector comes around.

As Secretary of the Cowichan Utility Poultry Association, we handled one car-load of brooder coal at a considerable saving to the members and a second car-load is on order.

Interest in small fruits is increasing rapidly and an organization of the fruit-growers is rapidly nearing completion.

I have frequently been asked to address meetings of the U.F.B.C., Farmers' Institutes, and Women's Institutes, and have addressed meetings in all parts of the Cowichan District, including Ladysmith, Somenos, Duncan, Glenora, Sahtlam, Cowichan Station, Cowichan Bench, Cobble Hill, and Shawnigan. I was asked to judge the annual ploughing-match at Glenora.

A night-school has been organized at Somenos and an average of seventeen farmers meet every Monday night for study of soil-management and kindred subjects.

At my request professors from the University of British Columbia put on short courses in February and in June. I assisted them in culling demonstrations which were held at Somenos, Quamichan, Cowichan Station, and Shawnigan.

Intending settlers are frequently referred to me by the Department of Agriculture. Usually they want an impartial expression on the local possibilities for different phases of farming or an unbiased opinion of lands for sale, and they have invariably expressed satisfaction on being able to get such opinion.

Articles dealing with local problems of general interest are published weekly in the Cowichan *Leader* and the editor has given me splendid support in my work.

In addition to callers at the office, requests for information and advice come from all parts of the Cowichan District by mail, and as a result a large number of letters have been dispatched from this office.

The amount of work done has been limited by the time at my disposal. No request for assistance has been refused, but at times it has been necessary to answer the more urgent calls first and leave the others. The work is growing steadily and should continue to do so as the value of such an office becomes more generally recognized.

Respectfully submitted.

Wm. Melvin Fleming,
Agricultural Representative.

REPORT OF AGRICULTURAL REPRESENTATIVE, COURTENAY.

S. H. Hopkins.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to report as follows on the district agricultural representative work undertaken by me here for the past year:—

Would say that I have been here now thirteen months. Last spring and summer I resided at Merville and my work then had chiefly to do with that settlement. Last fall, however, after the crops there had been harvested, I moved into Courtenay, the centre of the district, to take up a wider field of work and (permission having been granted) to open an Agricultural Office in the town.

Agricultural Office.

This is now being fixed up for my use and will be opened shortly. In the meantime temporary quarters are being used. Office furniture is on the way.

LECTURES.

As regards the work done during the past year: The first undertaking was a course of bi-weekly lectures and demonstrations covering six weeks on my arrival last February (1920). At the same period I was able to render assistance to Chief Surveyor Bishop in laying out the area to the best advantage. This involved covering long distances on foot over 14,000 acres.

DRAINAGE.

At the same time I found that work among the farmers of the valley generally was advisable, particularly with reference to underdrainage, which in this moist winter climate is most important. I was instrumental (with the aid of the Comox Creamery, which financed the deal) in getting the farmers to bring in a scow-load (50,000) of cement tile for drainage purposes. Several meetings of farmers were addressed.

Twenty-two drainage surveys were made. A personal canvass of farmers regarding drainage was undertaken.

LIME.

In this connection I may say that this winter I have been stressing the need of lime on the soil and have canvassed for orders of lime. So far three car-loads have been brought in.

SUPERVISING CROPPING AT MERVILLE.

To return to Merville: Last season the crops on 150 acres of cultivated land were put in, cultivated, and harvested under my supervision. All were satisfactory with the exception of potatoes, which were a failure, largely owing to the poor seed sent from Victoria.

BUYING STOCK.

Last fall and this winter a good deal of time has been spent looking for suitable cows and horses for the Merville settlers. Most of these have been bought locally. It will readily be appreciated that this is important work, because on the quality of the cows secured depends largely the success or otherwise of these settlers.

MEETINGS, ETC.

I am a director of the Comox Agricultural Association and a member of the Creamery Association and other agricultural societies. This necessitates attendance at a good many meetings in various parts.

Visits have also been made to farmers in Parksville and Alberni Districts. In addition, many visits are made as requested to farmers who wish to consult on various matters.

CORRESPONDENCE.

Correspondence hitherto has not been heavy, but is increasing.

POTATO STANDARDIZATION.

I may say that the latest phase of work undertaken is in connection with Mr. Tice's potato-standardization work. Every considerable grower of potatoes has been visited and his crop inspected in pit or cellar, in an effort to get really good local seed of two varieties only (Burbank and Up to Date). Local seed was felt to be safest this year, and am glad to say an adequate supply has been located here. Farmers here are in favour of standardization and our potato industry is promising.

EGG MARKETING.

I have been able to assist in getting the creamery to undertake egg collecting and marketing.

JUDGING AT FAIRS.

Fairs judged at this past fall were Parksville, Alberni, and Duncan.

WRITING FOR PRESS.

One important feature of the work the value of which cannot be overemphasized has been the weekly column in the local paper (Comox *Argus*) on agricultural topics written by me and printed as a weekly feature. As a means of getting and keeping in touch with the farming

public this cannot be beaten (except by personal canvass), and in any "campaign" its aid is invaluable.

This report of the main features of my work here as so far developed is respectfully submitted.

S. H. Hopkins,
Agricultural Representative.

REPORT OF PROVINCIAL PLANT PATHOLOGIST, VANCOUVER.

J. W. Eastham, B.Sc.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith my annual report for 1920.

New or Unusual Diseases noticed during the Past Year.

Club-root or Finger-and-toe of Crucifers (Plasmodiophora brassicæ).—This is a serious disease which renders the growing of turnips and cabbage very difficult in certain sections of the Maritime Provinces. It is also a serious pest in certain of the market-gardening sections of Ontario and Quebec. In 1910 it was reported as spreading rapidly in the Puget Sound area of Washington. It seemed, therefore, that it would only be a question of time before it appeared here, and a careful watch has been kept for it. The first authentic case was located this year on cabbages in a city garden at Victoria. Instructions have been given the owner for getting rid of it, and this small infection is not likely to become a centre for the spread of the disease to commercial crops. As the disease appears to be spread mainly in the form of spores on seed grown on infected fields, we have here a strong argument in favour of the purchase of cabbage, turnip, swede, and other cruciferous seeds grown in this Province where such can be obtained.

Blossom-blight of Sour Cherries.—Complaints were received from an orchardist in the vicinity of Victoria that the blossom on his sour cherries was withering up instead of setting fruit. Examination showed a very large proportion of blossoms affected; in some trees nearly 75 per cent. Microscopic examination and cultures showed the presence of the fungus *Sclerotinia fructigena* in the blighted parts. This is a common cause of the blighting of twigs and the rotting of the fruit of sweet cherries, plums, and prunes in the Fraser Valley. The case under consideration is unusual in affecting the blossom so extensively, especially of the sour cherry, which is less susceptible than the sweet, and in being so severe in the comparatively dry climate around Victoria.

Skin-spot of Potato (Oospora pustulans).—A peculiar superficial disease of the potato-tuber, developing particularly in storage, has been observed for several years past in the Lulu Island and Delta Districts. In the later stages, at any rate, a *Fusarium* has been found by the writer associated with it and resulting in a tuber-rot. There is reason to believe, however, that the disease is identical with one recently described in England as due to a fungus described as new under the name *Oospora pustulans.* This disease will receive further investigation.

Potato Mosaic.—This obscure disease which has proved so troublesome in the East has not been noticed to any extent in British Columbia before this season, when some severe cases were found on Lulu Island and traces of it in the Interior. As it is apparently transmitted in the tubers from affected plants, it is hoped that seed certification will help to prevent it from becoming serious with us.

Seasonal Conditions in relation to Plant-diseases.

The cold backward weather of the spring resulted in much early apple-scab infection even where spraying was carefully followed. This was due mainly to the fact that opening of the blossoms was delayed and too long a time elapsed between the "pink" and the "calyx" sprays; in some cases as long as twenty-five days. This gave the disease a good opportunity to establish itself. Where such conditions are probable it would undoubtedly be best to use a semi-dormant spray and postpone the "pink" spray until as close to blossoming-time as possible. This would shorten the period between the sprays materially, especially if the "pink" spray is usually put on fairly early.

The excessive rainfall during September and October has had a great influence in bringing about disease and conditions approaching disease. The September rains occurred before the time when it is usually necessary to do fall spraying against apple anthracnose. As a consequence much infection has probably occurred, the effects of which will not be visible until spring. Potato-growers in the Fraser Valley have suffered much from tuber-diseases, which have either rotted the crop in the ground or rendered it liable to much loss in storage as a result of infection from the soil. The excessive rainfall, however, was not confined to the Coast sections, but occurred also in the Dry Belt, producing a serious condition in certain apples. A box of Jonathan apples was sent to me early in December by the Dominion Fruit Inspector, R. G. Clarke, for examination and report. From this report I may extract the following:—

"This box contained 125 apples. Every apple was cut across for examination. Twenty-one apples proved to be sound, 104 were broken down in the flesh, four being completely rotten, and a large number in the last stage previous to collapse.

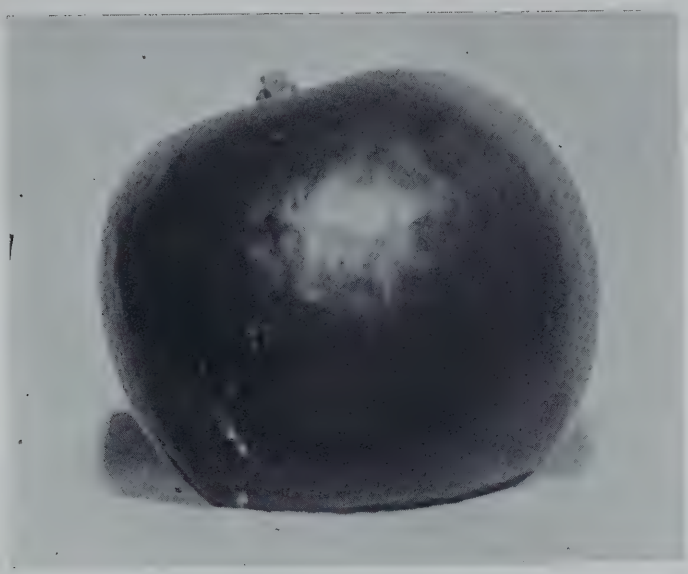
"Examination of the diseased ones showed, in the great majority of cases, glassy water-soaked areas around the vascular bundles (sap-tubes) in the flesh. This is quite well shown in the photograph I am enclosing to you, which, however, is from a different consignment. This is one of the indications of water-core which is simply due to too high a pressure of sap in the fruit. In a few cases, however, in the box sent there was no indication of this. All the breaking-down had apparently taken place from the outside inwards, and not from the sap-vessels as centres. Even the sound ones contained an excessive amount of water. This was shown by the ease with which they were bruised and the extent to which they broke down when cut. I put aside some of the cut, sound ones and left them a couple of days in the office. I was surprised to find the extent to which they had softened, the outside layer having broken down into mush. I think there is no doubt that the primary cause of this condition is the abnormal rainfall last September. This has acted injuriously in two ways: First, the excess of water in the soil has produced an excessive flow of sap, resulting in a water-core effect. Secondly, so much rainy weather has probably caused some of the growers to put off picking from day to day in the hope of securing better picking conditions. As a result the apples were overripe and disintegrated very quickly with the excessive sap they contained. Ordinarily, apples which are slightly water-cored, if picked on the green side, are likely to recover if kept in ordinary shed storage, but if, on the other hand, they are overripe they are pretty certain to break down. (I am calling this trouble water-core since I believe it to be of the same nature. At the same time I admit that it is not altogether typical, as even in the bad cases there is no liquid in the core.)

"Although the figures given above are bad enough in themselves, the actual facts are even worse. From what I saw at one of the large wholesale houses where a car-load was being repacked, as well as from my own experience, I would say that in many cases it is impossible to tell without cutting if the apple is sound or not, while even the sound ones contain so much water that they will break down very quickly."

This trouble has apparently been worst in the Okanagan, but we have also had complaints from Spences Bridge and Keremeos. King Davids were reported as affected in one case, but the trouble appears to be mainly confined to Jonathans.

Experiments in Apple-scab Control in the Kootenays.

Apple-scab is the most serious disease of the apple-crop in the Kootenays. Previous work has shown that good control can be obtained by three or four sprayings with lime-sulphur. At the same time there has been some suspicion of injury to foliage and dropping of fruit in certain cases as a result of these sprayings. In Nova Scotia lime-sulphur is reported as very injurious and most of the growers are said to have abandoned it and gone back to Bordeaux mixture. Ordinary Bordeaux mixture has been given up for some years on account of its effect in "russeting" apples, but it is claimed that by using a weak Bordeaux with a large excess of lime good control can be obtained without "russeting," more fruit is matured, and the vitality of the tree is greater. These points seemed to be of sufficient importance to warrant careful investigation and a set of spraying tests was carried out in conjunction with Mr. Hunt. At the same time the University of British Columbia placed at our disposal its dusting-machine and a supply of Bordeaux dust and sulphur-dust to make a test of the value of dusting as compared with spraying. The work was carried out on the ranch of J. J. Campbell, Willow



Jonathan apple apparently in perfect condition.

The same apple cut across. Most of the flesh is broken down, brown, and discoloured. There are water-soaked areas around the vascular bundles.

Melia's Oxford of Corfield, No. 12391, age 20 months. Grand champion at Chilliwack and New Westminster, 1920. Owner, Wesley McIntyre, Sardis, B.C.

Point. Detailed results of the work and the practical recommendations to be drawn from them will be presented at the fruit-growers' convention at Nelson on January 21st, 1921, and a full account, including experimental details, in the *Agricultural Journal*. It will be sufficient here to summarize the results obtained. It is to be noted that scab was severe, the check-trees showing scab on the fruit as follows: McIntosh, 98.5 per cent.; Spys, 74 per cent.; Kings, 89 per cent.

The Bordeaux spray was made up of 2 or 3 lb. bluestone and 7 lb. quicklime to 40 gallons of water and was used for all sprays except the "calyx" spray, for which the materials were 1 lb. soluble sulphur, 5 lb. quicklime, and 40 gallons of water. This treatment may be called, shortly, the "Nova Scotia formula."

(1.) The Nova Scotia formula with 3–7–40 for the delayed dormant spray and 2–7–40 for the "pink" spray, and again sixteen days after the "calyx" spray, gave good results in scab-control, though, on the whole, hardly so good as from four similar sprays of lime-sulphur.

(2.) In the case of McIntosh Red there was some evidence to show that the Nova Scotia B.M. resulted in an increased yield, trees receiving this spray having a much better crop than those receiving lime-sulphur, although apparently all were similar in age and conditions. In the case of Spys, also, the advantage appears in favour of B.M., the B.M. tree having 764 apples as against 548 on the L.S. one. With Kings, on the other hand, with two similar trees standing side by side in the same row, the B.M. one had 405 apples and the L.S. one 495. While the evidence on the whole tends to show that B.M. does not injure the yield, while L.S. may, the results are not so conclusive or striking as those obtained in the Maritime Provinces.

(3.) Serious russeting from B.M. occurred to the extent of about 10 per cent. in the case of McIntosh, but was absent or negligible in Spys or Kings.

(4.) The foliage of trees sprayed with B.M. was, on the whole, larger and of a better colour than on the trees sprayed with lime-sulphur.

(5.) Four Bordeaux dust sprays gave fairly good results on Spys (the only variety used)—viz., 14.9 per cent. scabbed—as compared with N.S.B.M. 10.5 per cent. and L.S. 2.6 per cent. It should be noted that most of the scab was very slight and hardly enough to blemish the fruit.

(6.) Sulphur-dust gave very poor results, with four sprays the percentage of scabby fruit running as high as 68 per cent. on Kings. This may be partly due to the fact that the material used for the earlier sprays was simply sulphur-dust and gypsum filler without arsenate of lead, which is supposed to increase the adhesive powers of the dust.

To sum up, it may be said that lime-sulphur has given excellent results in the control of scab, but with some injury to the foliage and possibly, in some cases, a dropping of the fruit. Where a grower using lime-sulphur is satisfied with his crop and the condition of his trees there would be little object in changing his methods. If, however, he is not getting the yields he has a right to expect and cannot find any other factor to blame except the spraying, he would do well to try the Nova Scotia formula carefully for comparison. For the larger orchardist Bordeaux dust seems promising, but experimental work will have to be conducted on a larger scale in order to form a proper estimate of the cost of using it commercially. Sulphur-dust hardly seems to be worthy of further trial under Kootenay conditions. Last year, with four sprays, the percentage of scabby fruit in McIntosh was 87 per cent.

Experimental and other Work.

In May I made the examination for infections in the experimental spraying which Mr. White is continuing at Keating, with a view to testing the superiority or otherwise of Burgundy mixture as compared with Bordeaux mixture. The former was made weak (1–1½–40) so as not to stain the fruit unnecessarily and applied September 12th, a plot being sprayed with 3–4–40 Bordeaux mixture on the same date. The Burgundy plot showed an average of 33 new infections per tree, while the Bordeaux plot only showed 9 infections per tree. Evidently, therefore, as might be expected, the Burgundy mixture was much inferior in the degree of protection it afforded, although offering much less danger of disfiguring the fruit. It will probably be found useful as a spray before picking, to be followed by a spray of Bordeaux as soon as picking is over. The following sprays were also used after picking, no previous application having been made: 3–4–40 Bordeaux, 6–6–40 Bordeaux, and lime-sulphur 1 to 9. The average infections per tree were found to be 42, 32, and 37 respectively. It was very noticeable, however, that although this later spraying was not nearly so successful as the earlier one in keeping down

the total number of infections, these were largely on the 1- or 2-year-old growth. The cankers on the large branches and limbs were much fewer. If for any reason, therefore, spraying has not been done before picking-time it would still be worth while to spray. It will be noticed that doubling the strength of the Bordeaux only increased the control by about 24 per cent.

Considerable attention has been given, in conjunction with Mr. Tice, to the question of certified potato-seed and the standard to be attained. As a preliminary a number of quantitative investigations have been made as to prevalence of certain diseases in the field. The figures obtained are incorporated by Mr. Tice in his report. Some experimental spraying of potatoes against late blight was conducted co-operatively with Mr. Chevalley at Chilliwack. The location of work under these conditions has to be determined by the reliability of the co-operator rather than by the risk of disease. Although the work was satisfactorily done, the results were negative, no blight developing on these plots, although there was a good deal in certain sections. An experiment conducted at Pitt Meadows along similar lines and also to test the value of a proprietary fungicide, Magnesium-Bordo, was also negative owing to the plants having died down before the incidence of blight.

Blackberry-growers around Mission and Hatzic were seriously concerned in August about a condition of the fruit, which, although hardly noticeable when the fruit was picked, developed rapidly during precooling. Affected drupelets turned a brick-red and the number in an affected berry varied from one or two to all. Frequently one side of the berry would be affected. In some cases almost all the berries in a box showed the trouble, such a sample having a decidedly unpleasant appearance. The berries seemed to show more of it during the earlier part of the picking season than later. Several car-loads were temporarily tied up on the grounds that the berries were affected by anthracnose, which is known to affect the berries, and it was feared they would not stand shipping. An investigation, therefore, seemed desirable. In the first place, a careful examination was made of the various plantations from whence the berries had come. Most of these were almost free from anthracnose, a disease which is not a serious enemy as yet of the Lower Fraser Valley blackberry-grower, but one or two badly diseased patches were found. The condition in question of the berries was no worse on the diseased patches than on healthy ones. Furthermore, although this condition is more conspicuous after precooling, it was easily picked out in the fruit still on the canes, affected drupelets being somewhat soft and dull-coloured. Such drupelets seemed to be affected as a whole in all cases, there being no evidence of the condition having extended from a central point, where infection might have taken place. The skin was always intact. Neither microscopic examination nor cultures showed the presence of an organism. Taking everything into consideration, it seems likely that the trouble was of the nature of a sun-scald. Later reports showed that shipments of these berries did not show any noticeable deterioration during shipment as compared with normal fruit.

Yellow leaf-rust of raspberries (*Phragmidium imitans*) was very prevalent in 1919, as is recorded in my report for that year. This year numerous examinations were made throughout the season in the areas where the disease was prevalent last year. While it was possible to find the disease after careful search, it was absolutely negligible as an economic factor. There is every reason to believe, therefore, that it is only under very exceptional seasonal conditions that it is of any consequence.

CODLING-MOTH OUTBREAK AT NEW WESTMINSTER.

Two years ago codling-moth was suspected at New Westminster, but the insect itself could not be discovered. Last year the worm was found by an Inspector on the staff of the Inspector of Imports near the corner of Sixth Avenue and Fourth Street. From this point as centre a survey of New Westminster was made in August. Serious infestation was found throughout the area contained between Government Street on the east, Columbia Street on the south, Tenth Street on the west, and slightly north of Eighth Avenue on the north. This area includes the most densely populated part of the city, being mostly built up, and almost every lot having one or two apple-trees. Infestation was very heavy in some cases, one or two trees at the starting-point showing 50 per cent. of wormy apples. Elsewhere worms were scarce, only two, for instance, being discovered in the large orchard of the Mental Hospital. Many of the trees on these lots have been allowed to grow very high and are quite unpruned. In some cases there is no means of getting a power-sprayer close to the lot. A campaign directed towards eradication

will be very expensive. A four-page circular has been prepared by the Horticultural Branch, and it is intended to personally deliver one of these to the occupier of each lot in the infested area and to induce him to take measures against the pest in his own interest. The question of a quarantine to prevent any movement of apples and pears outside this area will have to be considered.

New Westminster is, of course, not in a fruit-producing district and there will be little public sentiment behind vigorous control measures. For the same reason, however, there will be no hardship inflicted by complete quarantine, and provided the fruit-growing districts can be adequately protected in this way it will be the simplest and cheapest way of dealing with the pest.

Miscellaneous.

G. S. Coward, B.A., was appointed as temporary assistant for the months of May to September, inclusive. Mr. Coward's services enabled me to leave the office for longer periods in connection with field-work. He also spent much time on the codling-moth survey.

Mr. Ruhmann, while nominally my assistant, with headquarters at Vernon, has devoted his whole time to entomological work under the direction of Mr. Treherne. I think, therefore, it will be more logical to include his report with Mr. Treherne's.

In addition to my regular work, I have also given one or two lectures and demonstrations per week to the agricultural classes in the Department of Soldiers' Civil Re-establishment at the University, furnished reports in connection with the Dominion Plant-disease Survey, and assumed responsibility as a collaborator to the new scientific journal, *Botanical Abstracts*, for abstracts of all publications of the Provincial Department of Agriculture.

Respectfully submittted.

J. W. Eastham,
Provincial Plant Pathologist.

REPORT OF ASSISTANT ENTOMOLOGIST, VERNON.

Max. H. Ruhmann.

J. W. Eastham, B.Sc.,
Provincial Plant Pathologist, Vancouver, B.C.

Sir,—I have the honour to submit the following summary of work in the Okanagan District for the year 1920 under the direction of R. C. Treherne, B.S.A., Dominion Field Officer for British Columbia. The technical details of the work are included in Mr. Treherne's report.

The major subjects of the season's work were a continuation of last year's study of the life-history and control of the imported onion-maggot (*Phorbia ceparum*) and the control of the cabbage-root maggot (*Phorbia brassicæ*).

The minor subjects for the year were as follows: (*a*) Arranging insect and plant pathological displays for farmers' fairs and exhibitions; (*b*) to take charge of library of the Horticultural, Entomological, and Plant Pathological Branches of the Department of Agriculture at Vernon; (*c*) To act as curator of the entomological collection at Vernon; (*d*) to undertake all photographic work for the Department of Agriculture at Vernon; (*e*) general office and laboratory routine, and to answer correspondence relating to plant pathological and entomological inquiries.

The Imported Onion-maggot (Phorbia ceparum).

Life-history.—Further biological notes were obtained and the presence of a partial third generation determined.

Control.—The conclusions reached from our observations during 1919 suggested the recommendation of planting a trap-crop of cull onions at the time of seeding, this being removed on June 16th, at which time thinning should commence, the thinnings and trap-crop being immediately destroyed by burning or boiling on removal. A commercial experimental test of these recommendations was undertaken on a 9-acre block of onions in the Vernon District. The regular seeding was completed on April 12th, every hundredth row of seed being omitted; in these blank rows cull onions of the 1919 crop were planted not less than 2 inches below the soil-surface and 2 inches apart in the row. The flies commenced to lay their eggs on May 17th,

on which date a number of individual trap-onions and 10-foot rows of seedling onions were staked off for continuous observation. By June 12th 410 eggs had been collected from six trap-onions and one egg from six 10-foot rows of seedling onions. Although only one egg had been found on the six rows of seedlings staked for observation, slight infestation was present over the entire area; being, however, only 0.18 per cent. it was of no commercial importance. The average oviposition on the trap-onions was: Attractive type (leafy from the ground), 74 eggs per plant; unattractive type (long-necked above ground), 1.8 eggs per plant. After the removal of the trap-crop on June 16th oviposition was forced on to the seedling onions, but, as found during 1919 from this period to harvest, oviposition was almost entirely confined to the weaker plants and resulted in only slight loss. The crop harvested from this experimental block averaged 21.2 tons per acre of marketable onions. Although this was not a heavy fly year, the trap-crop method of control promises to be of great value.

CABBAGE-ROOT MAGGOT (PHORBIA BRASSICÆ).

As a result of our experiments in 1919 in the control of this pest with bichloride of mercury, a more extended experiment on a commercial scale was determined upon. Accordingly a block of 25,000 early cabbages was selected for treatment, the grower putting this at our disposal and paying for the material and labour used. Our recommendations were to make four applications of bichloride of mercury dissolved in the proportions of 1 oz. of the mercury salts dissolved in 10 gallons of water, first dissolving the mercury salts in boiling water in a wooden container in the proportion of 1 oz. to 1 quart of boiling water, then diluting the stock solution in the field to the desired amount.

As the experiment was under our personal control, the first application was not made until the commencement of oviposition, which was on May 11th; as this was sixteen days after the plants had been set in the field, it was considered that three applications would be sufficient. These were made at ten-day intervals, using approximately 2 fluid ounces of the bichloride solution to each plant at each application. No maggot-injury resulted and 32 tons of cabbages were marketed from this block, as against 16.5 tons from the same acreage in 1919.

A second experiment was conducted by a grower in Armstrong, using three separate blocks of early cabbages of approximately ½ acre each. Block 1 was untreated; Block 2 was protected with tarred-felt disks; Block 3 was protected with four applications of bichloride of mercury, the first being applied three days after setting in the field, followed by three more applications at ten-day intervals.

The results reported were as follows: Block 1, 25 per cent. marketable heads; Block 2, 75 per cent. marketable heads; Block 3, 100 per cent. marketable heads.

In an accompanying letter our correspondent stated that slight infestation occurred on the block treated with bichloride of mercury after the fourth application, but no apparent injury resulted. The cost of the treatment with the mercury salts for four applications in labour and material was approximately 1 cent for each four plants treated, paying $4.50 per pound for the bichloride of mercury, this being unusually high.

Fall fairs attended this year were Kelowna, Armstrong, and Penticton. Exhibits of insect pests and plant-diseases were displayed at these fairs, part of these exhibits being later sent to the fall fairs held at Peachland and Naramata.

Respectfully submitted.

MAX. H. RUHMANN,
Assistant Entomologist.

REPORT ON THE CONTROL OF THE IMPORTED ONION-MAGGOT (HYLEMYIA ANTIQUA).

M. H. Ruhmann.

In the year 1919 the following more essential points in the life-history and control of the imported onion-maggot were determined:—

Life-history Records of 1919.

(1.) Puparium stage occurs during winter.

(2.) First male flies on wing, May 10th. First females on May 12th in the field.

(3.) Height of spring oviposition period, June 6th. First eggs on May 18th in insectary and May 19th in field.

(4.) First minute larvæ seen in onions in field on May 24th.

(5.) Length of egg stage, 3 to 8 days; larval stage, 16 to 29 days; puparium, 14 to 26 days.

(6.) First puparium found on June 14th.

(7.) Second-generation adults appeared on July 7th.

(8.) Third generation believed to exist, but not satisfactorily proven; believed to have appeared about August 23rd.

(9.) Full notes collected on habits of flies, demonstrating choice of plant for oviposition.

(10.) The importance of the volunteer onion as a trap-crop realized; an average of about 500 eggs per volunteer being taken.

(11.) Notes taken on oviposition on seedling onions.

(12.) Longevity of adults: Males, 3 to 13 days; females, 3 to 33 days.

Control Tests for 1919.

(1.) Eight acres used in experiment to test value of molasses-sodium arsenite bait.

(2.) Special bait-cans devised.

(3.) Heavy mortality of flies after feeding on bait.

(4.) Molasses proved to be the best attractive; various essential oils being tested.

(5.) The influence of volunteer onions was noted to be very great and interfered with the bait tests.

The Object of the 1920 Studies.

Life-history.—(1.) Incidental notes on egg stage; larval; puparium.

(2.) Special large field cage for continuous breeding records to prove the presence of third generation.

(3.) Confirmation of habits of flies in the field.

(4.) Commencement of hibernation.

(5.) First appearance of adults, eggs, larva, puparia in the field.

(6.) Duration of generations.

Egg Stage.—The length of the egg stage was fully demonstrated during 1919. There was no necessity to duplicate the work in detail. Suffice it to say that such observations made in 1920 agreed with those of 1919, the egg stage varying from 3 to 8 days.

Larval Stage.—This was shown in 1919 to extend for 16 to 29 days. The 1920 records on this point show a variation of 14 to 21 days.

Puparium Stage.—This was shown in 1919 to vary from 14 to 26 days, with one record of 38 days in the autumn. In 1920 this stage lasted 14 to 20 days.

Summary of Life-history in 1920.

The first eggs observed in the field in 1920 were taken on May 17th, two days earlier than in 1919. In 1919 the first adult flies were taken in the field on May 10th. In 1920 the first adults were captured on May 15th by sweeping the grass around the borders of the field. The weather during May, 1920, was on the whole dull and windy and the flies were not active. It was assumed that the adult's emergence would have been later than 1919, but on the contrary

it was earlier. A glance at the appended weather charts will show that the average mean temperatures for May, 1920, were higher than for the same month in 1919. This point was not fully appreciated until the month of May had passed.

The first larvæ found in the field in 1920 were taken on May 22nd. The first puparia were taken on June 6th, a larval period of about 15 days for the first appearing stages of the first generation. The first adults of the second generation appeared on June 29th in 1920, as against July 7th in 1919 in the insectary. It may be assumed, therefore, that all eggs taken in the field up until June 29th were eggs deposited by the first or spring generation of flies, and, further, that emergence from the soil continued until approximately this date. The maximum and minimum ranges, therefore, of the spring generation varied approximately between May 10th and the end of July.

The main object of the 1920 studies was to prove the existence of third-generation adults. This could only be done by continuous breeding records from known stages of the first generation. A large undetermined number of first-generation larvæ were collected in the field during the last week of May, 1920. These were brought into the insectary and fed on onion-leaves, the larvæ being introduced individually into the hollow leaves, which were then placed in long glass vials containing a small quantity of moist sand. Special attention was paid to the moisture content of the sand and the larvæ were periodically transferred by means of a camel's-hair brush into fresh onion-leaves until pupation took place. Puparia were held in glass vials partly filled with moist sand and stopped with absorbent cotton. The first emergence of second-generation adults from these puparia took place on June 29th and adults continued to emerge until July 17th, when a total of 184 adults, of which approximately 40 per cent. were females, had been obtained. Inasmuch as the records of the lengths of the larval and puparium stages were obtained in fair detail in 1919, it was not considered necessary to follow the life stages of each individual larva in this experiment. It was considered necessary only to obtain the dates of pupation and adult emergence. The first puparia were found on June 6th and the first adult, as stated above, appeared on June 29th.

CONTROL OPERATIONS IN 1920.

It will be remembered that during 1919 the experiments primarily outlined for the control of the onion-maggot called for tests on the value of the sodium arsenite-molasses bait. In fact, in the spring it was believed that this bait would prove highly efficient in view of the satisfactory results in Eastern Canada. It will also be recalled in our last annual report that the presence of volunteer onions from the 1918 year crop upset the calculations and opened up the great possibility of using volunteer onions as trap-crops. Consequently, in 1920 we commenced the season with the object of testing the comparative values of trap-crops, baits, early and late thinning against untreated control blocks.

Nine acres of onions were engaged for the trap-crop test, 4 acres of onions for the bait, and 5 acres for control. We were ultimately unable to carry the early and late thinning operations.

THE TRAP-CROP VOLUNTEER EXPERIMENT.

Nine acres of land less than a quarter of a mile from the land used in 1919 was chosen. The soil was a rich sandy loam which had been under cultivation for some years and which had received regular applications of stable manure as well as artificial fertilizers. Several sacks of cull onions had been saved from the 1919 crop for use in 1920. The regular onion-seeding was completed on April 12th, and at regular intervals of approximately 100 feet throughout the entire plantation instructions were given to leave a row unseeded. In these vacant rows the cull onions were planted, being spaced approximately 2 inches apart in the row. There were 10 rows of these trap-onions planted in the field when the work was completed, each row being 315 feet long, or, in other words, 3,150 feet of trap-onions to the 9 acres. These onions averaged 5 plants to the foot, making a total of 15,750 plants approximately. It was intended that these culls should be set 3 to 4 inches deep, but it was difficult to get the Chinese labourers to follow instructions, with the result that the culls did not average more than 1½ inches below the soil-surface. The planting of culls in the vacant rows was completed on April 13th. The object of setting the culls deep was believed to be a necessity in order to produce a better growth which threw its foliage at ground-level, a type of growth which was believed to be preferred by the female flies for oviposition. We were not quite satisfied with the 1½- to 2-inch depth,

but it was impossible to make any alteration at the time. However, in order to test the results of a shallow and deep planting, side and upright planting, a series of onions were planted under our own guidance. The results did not show any marked difference, as all types of growth, from bushy leaf-growth to spindly neck-growth, appeared. It was felt, however, that the test-onions were planted too close together, thereby influencing the growth. This point requires further elucidation another year, inasmuch as we are convinced that it is a special type of growth which is especially favourable for oviposition.

On May 5th the stand of seedling onions was excellent, the rows being just apparent, and the trap-onions were at this time making a nice growth, with a pronounced leaf-growth breaking through the ground. Close watch was being kept for adult flies, but none were observed until May 15th. The weather was dull and the flies inactive. However, on this date 6 volunteer trap-onions were selected at random in different parts of the field, but an endeavour was made to chose that type of onion which showed prospects of producing a bunchy leaf-growth close to the ground-level. These onions were staked and were the subject of frequent and continuous observation. Furthermore, 6 rows, each 10 feet long, of seedling onions were also staked for continuous observation.

Oviposition on the Six Trap-onions.—First oviposition occurred in the field on May 17th, but none took place on the observation plants until May 19th. The record follows:—

Date.	1.	2.	3.	4.	5.	6.
May 19	22	53	7	..	..	..
„ 21	..	2	..	..	..	..
„ 25	..	53	3	24	15	11
„ 28	9	37	..	9	7	..
„ 31	..	39	..	29	2	5
June 4	17	5	..	7	..	..
„ 9	19	..	..	5	6	12
„ 12	12	..	..	3	9	8
Totals	79	169	10	77	39	36

This makes a total of 410 eggs for the 6 plants. No. 3 developed a short neck after staking and therefore should not be considered in figuring the average for typical plants. It shows, however, the importance of typical plants for oviposition, a point we have realized for two years, but have not been able to assign a perfect reason for. The 6 trap-onions were removed on June 14th, the date provisionally set for the removal of all trap-onions in the field, and no further eggs were found on them. They were, however, examined for the presence of larvæ which might have escaped observation in the egg stage and 34 were found. Therefore a total of at least 444 eggs had been laid on the observation plants between May 17th and June 12th, an average of 74.

A very careful survey of all the volunteer trap-onions in their rows was made, and it was figured that only 940 of the approximate total of 15,750 were of the suitable type, or about 6 per cent.

An effort was made to count the eggs and larvæ on volunteer trap-onions not of the suitable type, and 20 "long-necks" were examined on June 13th, with the following results:—

Eggs ..... 0 0 2 0 0 4 1 0 0 0 0 7 0 0 0 1 0 0 0 0 = 15
Larvæ ... 0 0 5 0 0 1 3 0 1 3 0 2 0 0 3 2 0 1 0 0 = 21

Total 36

Or an average of 1.8 per cent.

The trap-crop was destroyed by boiling on June 14th to 16th.

While it is unwise to be too sanguine over the deductions drawn from this work, we may feel secure in the belief that a very large number of first-generation eggs were deposited on the trap-crop and that the seedling onions were saved from infestation. Our contentions in this regard are supported by the data that follows:—

Oviposition on Staked Seedlings before the Removal of the Trap-rows.—Six rows, each 10 feet long, of seedling onions in different parts of the field were staked on May 17th. Egg-counts were made before thinning and before the destruction of the trap-crop.

Date.	1.	2.	3.	4.	5.	6.
May 19	..	..	..	..	..	..
„ 21	..	..	..	..	..	..
„ 25	..	..	..	..	..	..
„ 28	..	..	..	..	..	..
„ 31	..	..	..	..	..	..
June 4	..	..	..	..	..	..
„ 9	1	..	..	..	..	..
„ 12	..	..	..	..	..	..

It will be seen that only 1 egg was laid on the 6 rows during the period under observation. However, in order to determine the degree of infestation on the seedling onions over the field as a whole, other than on the observation rows, a general survey was made on May 26th and on June 7th. On May 26th a very slight infestation was observed on the seedling onions, and even through the period of heavy oviposition that followed the infestation was so light as to be of no consequence.

Actual Larval Infestation on Seedlings.—On June 7th 10 full rows, each 315 feet long, of seedling onions in different parts of the field were examined for actual larval infestation. This work was done to check our results on the daily egg-counts on the staked seedling rows and was accomplished by walking slowly down the row carefully examining each plant. No plant was touched unless it showed injury, even the slightest, in which case it was pulled up and the plant dissected and larvæ counted.

The following number of plants were counted to the foot of row: 74, 83, 52, 49, 67, 59, 92, 83, 47, 78, an average of 68.4 plants, making a total of approximately 21,546 plants to the 315-foot row. This was the actual germination and this number of plants on the 315-foot row yielded the following larval infestation in the 10 rows, viz.: 23, 37, 58, 16, 83, 21, 52, 31, 38, 29, an average of 38.8 to each 315-foot row, a shade over 1 plant infested in 555 plants, or 0.18 per cent. in 100 plants.

Oviposition on Staked Seedlings after the Removal of the Trap-crops and after Thinning.—Thinning on the whole plantation commenced on June 16th and was completed towards the end of June, and the trap-crops were all removed and destroyed by June 16th. No further oviposition records were taken until after thinning had been completed and as soon after as the subsequent irrigation permitted. The same staked rows of onions were again examined periodically in comparison with the former table, only bearing in mind that the number of seedlings per foot before thinning was 68.4, whereas after thinning a fair average per foot was between 12 and 15.

Date.	1.	2.	3.	4.	5.	6.
June 30	25	12	6	7	..	4
July 3	16	4	8	6	2	1
„ 7	12	6	..	6	3	2
„ 10	8	1	..	2	6	9
„ 14	14	9	3	7	2	1
„ 17	5	8	1	3	..	6
Totals	80	40	18	31	13	23

This makes a total of 205 eggs or an average of about 34 eggs to each 10 feet of seedlings after thinning, and it is indicated that the oviposition was forced on to the seedlings when the counter-attraction of the trap-crop was removed. The seedlings on the entire plantation in mid-July were well grown, being over a foot in height. Oviposition taking place in July was generally noted confined to the weaker plants.

Results.—We are safe in assuming that the value of the trap-crop in the control of the onion-maggot is very great. As it happened, the season of 1920 was not considered a bad

maggot-year; consequently it would be fairer to give the method a further trial in a bad maggot-year.

Harvesting commenced at the end of September, when 50 per cent. of the crop was sold green and unripened. The remainder of the crop was harvested towards the end of October and was allowed to ripen in the field. The crop harvested was 21.2 tons to the acre from the grower's sale-slips. The average crop this year in Kelowna, Armstrong, and Vernon was about 10 tons to the acre.

The cost of applying cull onions as trap-crops was slight, only 4 men for 2 days in planting and 4 men 1 day in destruction, spread over 9 acres. The method shows great promise and local growers are satisfied with the results.

Acknowledgment.

My thanks are due to Mr. R. C. Treherne, Federal Entomologist in charge for British Columbia, for his encouragement and advice in drafting the general outline of the experiments.

REPORT OF CHIEF INSPECTOR OF IMPORTED FRUIT AND NURSERY STOCK AND ACTING COAST MARKETS COMMISSIONER, VANCOUVER.

W. H. Lyne.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith a report of the work carried out by the Inspector of Imported Fruit and Nursery Stock and his staff of assistants during the year ending December 31st, 1920.

The official staff provided to assist your Inspector to carry out the several details of the work for which he is responsible consists of the following officials:—

Those on regular salary and stationed at Vancouver are: D. Gavet, First Assistant; W. J. Graham, M. L. Bird, and H. F. Olds, General Assistant Inspectors; and Miss Hicks, Clerk-Stenographer. Other members of the staff at Vancouver are employed casually by the day when their services are required. They include: J. Lane, Foreman at the Fumigation and Inspection Station; H. Epps, Inspector and Packer; W. Sandall, Inspector and Packer; J. E. Jones, Packer; Wm. Watkins, Packer. Also other men when needed to handle large shipments of nursery stock.

The outside staff of Quarantine Officers are stationed at the several entry-ports and paid at the rate of $5 per day for actual time devoted to inspection of imported fruit, vegetables, etc. These are: G. E. Wilkerson and H. Whiteoak, Victoria; A. C. Wilson, Nanaimo; A. W. MacLean, Prince Rupert; W. E. Johnson, White Rock; A. J. Smith, Douglas; A. K. Westland, Pacific Highway; R. H. Eby, Abbotsford; W. L. Blatchford, Huntingdon; R. W. Grigor, Rossland; Fred Adie, Waneta; W. J. Cook, Grand Forks; Angus Cameron, Cascade; R. D. Kerr, Midway; Andrew Porter, Myncaster; A. F. Eady, Bridesville; Dr. Jermyn, Osoyoos; M. Chamberlain, Similkameen; Edward Covell, Kingsgate; J. A. MacDonald, Newgate; Chas. A. Cock, Cranbrook; W. H. Whimster, Fernie; Thos. Steed, Revelstoke; and F. J. Seager, Lucerne.

J. C. Rykert at Port Hill and J. S. Heals at Penticton look out for infested fruit or vegetables that may be brought in from the United States by auto or other road traffic. H. T. Thompson at Chilliwack acts as Quarantine or Field Officer when required.

New Officials appointed during 1920.

The following Fruit Quarantine Officers were appointed by your Inspector: W. E. Johnson, White Rock; A. J. Smith, Douglas; and A. K. Westland, Pacific Highway. Mr. Johnson is the Customs official in charge of the three entry-ports; the other two officers were appointed to act as his deputies.

F. J. Seager was recently appointed at Lucerne, but has just resigned, and possibly C. G. Barber, Provincial Police Constable for that district, may be appointed to take Mr. Seager's place, provided he is able to carry on the work in connection with his police duties.

ENTRY-PORTS VISITED BY INSPECTOR.

Owing to an exceedingly busy year and the necessity for being as economical as possible, only those Quarantine Officers stationed at the several entry-ports requiring special attention were visited by your Inspector; i.e., Revelstoke, Lucerne, White Rock, Huntingdon, Abbotsford, Nanaimo, and Victoria. During the present year it will be necessary to visit every officer and possibly re-establish a quarantine station at Powell River and open new ones at Ocean Falls and Anyox.

MONTHLY REPORTS.

The Quarantine Officers are instructed to send in their reports each month, covering any shipments of fruit or vegetables, etc., that may have entered the port at which they are stationed. Such reports, together with the duplicates of certificates issued and inspection fees collected, are forwarded to your Department at Victoria after being checked and recorded at the office of your Inspector in the Court-house, Vancouver.

BULLETINS AND LETTERS.

All the horticultural, field, and live-stock bulletins have been available to the public at the Vancouver office in the Court-house. There has also been a brisk demand for practical information regarding the several branches of agriculture.

Outgoing letters for the year number 1,099, and incoming 870.

INSPECTION OF IMPORTS.

During the year all importations of horticultural and field products liable to carry injurious pests or diseases were inspected at the several entry-ports. All nursery stock, trees, shrubs, and plants imported into the Province were, as usual, inspected and "that of a certain class" fumigated at the Vancouver Station provided for that purpose.

A tabulated list of all imported products inspected is included with this report, and also a list of those condemned. (*See* Appendices Nos. 9 to 19.)

IMPORTED NURSERY STOCK.

The quantity of nursery stock imported during the spring months was somewhat similar to that of the previous season. The fall and winter importations, however, increased considerably. There was considerable trouble in connection with several of the spring shipments of standard fruit-trees from the States of Oregon and Washington. Owing to a very early cold snap the previous fall large numbers of trees in the nurseries were seriously affected. The extremely low temperature occuring before the stock was in a sufficiently dormant condition resulted in many of the young trees being frozen to within a few inches of the bud or graft union. Such trees would have been an absolute failure the following year unless cut back below the injury, which would mean growing an entirely new head from the crown up. Many were frozen too far down to allow even for that remedy.

Under the circumstances these unfortunate shipments were an imposition on the people who had bought them for first-class stock and were condemned accordingly. The shippers were given the option of having the condemned stock returned to them or allowing it to be destroyed.

Several of the imported trees, shrubs, etc., were condemned for various insect pests and diseases, such as San Jose and other scale insects, woolly aphis and root-borers, bark-canker and crown-gall.

Importations of nursery stock arrived from several parts of the world, notably England, France, Belgium, United States, Japan, and Eastern Canada.

A trial shipment of ornamental trees from Holland via the Panama Canal was very disappointing. It left Holland on October 11th and did not arrive at Vancouver until December 17th. Fully 80 per cent. of the stock was of no commercial value owing to its having become badly heated en route.

Probably much of the damage could have been avoided had the boxes been so constructed and the stock packed to allow for better ventilation. Many previous shipments of ornamental stock from Europe have suffered considerably from frost-injury incurred while crossing the continent from the Eastern seaboard during the winter months. It was owing to those conditions that the trial shipment was made via the Panama Canal. Unfortunately the first trial did not prove a success.

STRAWBERRY-PLANTS.

The demand for strawberry-plants last spring exceeded the supply from reliable sources and resulted in a large number being shipped that were badly infested with the crown-miner (*Aristotellia* sp.). Some of the shippers had apparently dug up their old strawberry-beds to enable them to fill their orders. Most of that class of stock came from the States of Washington and Oregon and a considerable number of the plants were condemned. Under normal conditions prevailing other years, when most of the strawberry-plants came from such shippers as R. M. Kellogg and other reliable sources, very few were condemned.

LOGANBERRY STOCK.

The demand for loganberry stock was also very lively and several shipments of both tips and suckers arrived. The early cold snap the previous fall reduced the supply of tips considerably and many were rejected owing to frost-injury.

RASPBERRY AND BLACKBERRY STOCK.

There was also a lively demand for raspberry-canes and blackberry stock, some of which it was necessary to condemn for scale (*Aulacaspis rosæ*), crown and stem borer, and root-gall.

JAPANESE BEETLE.

The Japanese beetle (*Popillia japonica*), which threatens to become a very serious pest in certain sections of the Eastern United States and Canada, may very easily be introduced into British Columbia if special precautions are not taken with nursery stock and plants imported from Japan. This particular stock is accordingly receiving very close attention at the Vancouver Fumigation Station.

Larvæ resembling that of the Japanese beetle have already been found in the roots of some ornamental trees and iris-plants from Japan when being inspected at Vancouver. These were immediately forwarded to Ottawa and were identified as being a closely allied species of our native *Anomolas*. A more recent find, however, has been sent to Ottawa and is being bred to the adult stage in order to definitely prove its species.

EUROPEAN CORN-BORER.

Nursery stock and packing from Europe, the Eastern United States, and Eastern Canada liable to carry the European corn-borer (*Pyrausta nubilalis*) is also closely inspected.

POOR PACKING.

A number of nursery-stock shipments arrived in bad condition, mostly the result of poor packing, although rough handling en route was responsible for some. The consignee of such shipments would sometimes imagine the injury to the stock was caused by the process of fumigating or carelessness of the officials at the fumigating station.

Each shipment of stock is recorded as it arrives at the fumigating station. Its condition and list of any stock that may be condemned for insect pest, disease, or objectionable physical condition are also recorded. In the event of complaint being made it is only necessary to look up the entry in order to report the actual conditions under which the stock arrived.

IMPORTED FRUIT, VEGETABLES, ETC.

The tabulated list of imported fruit and vegetables that accompanies this report gives the comparative amount imported during 1920 and the previous year. Several straight car-loads of apples and pears, also some smaller shipments, were condemned owing to their being infested with codling-moth larvæ. Plums, apricots, and peaches condemned were infested with larvæ of the peach-twig and fruit borer (*Anarsia lineatella*), also brown-rot. Mexican tomatoes condemned were infested with the corn-ear worm (*Heliothis obsoleta* Fab.).

WALNUTS CONDEMNED.

One hundred sacks of Manchurian walnuts were condemned for reason of their being badly infested with larvæ of *Plodia interpunctella*. They were also rancid and unfit for human consumption, evidently very old stock. California walnuts were watched very closely for any sign of codling-moth, but none was detected.

IMPORTED POTATOES.

Never before in the history of British Columbia have so many potatoes been imported for home consumption as during the year just ended, the total shipments amounting to 9,812 tons 1,004 lb., from which 186 tons 344 lb. were condemned. The sources of supply were: From Alberta, 1,245 tons; United States, 8,463 tons; Japan, 9 tons; and New Zealand, 95 tons. All the New Zealand potatoes were condemned for tuber-moth.

Most of the United States potatoes were from Yakima, Toppenish, and Mount Vernon, State of Washington. Only three straight cars from United States were condemned and shipped back owing to *Fusarium* rot and corky scale, although several cars were ordered to be resorted for a similar cause and frost-injury.

GOVERNMENT INSPECTION OF POTATOES.

It was no doubt the result of Government inspection that so few potatoes imported from the United States were condemned, considering the large quantity involved. Most of the potatoes from the State of Washington were bought subject to their passing the United State Inspectors as No. 1 grade, and the bills of lading were accepted subject to the inspection certificate that accompanied each car. This procedure created a wonderful degree of confidence between shipper and buyer and probably accounted for the lively demand for potatoes from across the boundary. There were not more than a dozen cars for which the certificates were challenged, and, everything considered, it was evident the Inspectors were doing good work.

The subject of Government inspection and grade is being considerably discussed, those in favour claiming it creates greater confidence between shipper and buyer and that the grower gets a just reward for his product. All of which results in the consumer getting better value for his money.

NEW ZEALAND POTATOES CONDEMNED FOR TUBER-MOTH.

On May 23rd the R.M.S. "Niagara" arrived at Vancouver with 1,360 crates and 90 sacks of potatoes from Auckland, New Zealand. She also unloaded 365 crates at Victoria, B.C. A very careful inspection of these potatoes disclosed the fact that they were infested with tuber-moth in the larvæ and cocoon stages. The whole of the potatoes were accordingly reloaded into the boat that brought them and shipped to Honolulu. The total amount of the consignment was about 95 tons.

A very careful watch is kept on all potatoes arriving from the Orient, Australia, New Zealand, or Tasmania. Even the ship's stores are inspected before anything is allowed to be taken from the ship.

IMPORTED CORN, ETC.

The principal sources of corn or maize supply to British Columbia are Minneapolis, United States, and Manchuria. The United States corn as a rule gives very little trouble regarding moth or weevil. Occasionally some of the new crop may arrive in a badly heated and mildewed condition. Such was the case with two or three cars, one of which was refused entry at Victoria. Several shipments of Manchurian maize arrived badly infested with weevil and larvæ of the *Plodia* moth, necessitating fumigating with carbon bisulphide.

Peanuts, rice, beans, and peas came in for their share of attention. The peanuts and rice requiring fumigation were infested with *Plodia interpunctella* and *Pyralis farinalis* moth and larvæ, *Tenebroid* and *Tribolium* beetle, also weevil (*Calandra oryza*).

PEA-WEEVIL.

Owing to this Province being comparatively free from the pea and bean weevil (*Brushus pisorum* and *Brushus obtectus*) we keep a sharp look-out for all peas and beans from Europe, the United States, Australia, China, Japan, and Eastern Canada. All shipments infested with these particular insects are fumigated or shipped out of the Province.

AUSTRALIAN WHEAT CONDEMNED.

On April 10th the auxiliary fore-and-aft ship "Laurel Whalen" arrived at the Government Wharf with 1,300 sacks of wheat, or about 120 tons, from Australia. The wheat was all that remained of 1,200 tons shipped to a Vancouver firm and was taken aboard the "Laurel Whalen"

at Sydney, Australia, in September, 1918. Owing to a series of accidents resulting from adverse weather, etc., the ship was delayed and the wheat damaged to such extent as to necessitate most of it being discharged at Popeete. The 120 tons that finally reached Vancouver was so badly infested with *Tribolium* beetle, musty, and sour as to be totally unfit for human or animal consumption.

After being condemned and refused entry by your Inspector, whose action was upheld by the Dominion Health Department, permission was granted the agents to dispose of the wheat to the Globe Fertilizer Company, who agreed to sterilize it. The necessary sterilization was accomplished by passing the wheat through a heated iron cylinder in operation at the Globe Fertilizer Works on the North Arm of the Fraser River. After passing a test made by the Dominion Health Department the Fertilizer Company was permitted to utilize the wheat for chicken-feed.

Australian Onions.

On July 16th 1,200 crates of onions arrived from Australia ex S.S. "Waihemo." A large percentage were rotten and breeding millions of pomace-flies. The several consignments were ordered to be sorted and the rotten onions properly disposed of, which amounted to 257 crates.

Dominion and Provincial Co-operation.

In order to provide protection with as little official duplication as possible your Inspector was appointed a Dominion Inspector under the Dominion "Destructive Insect and Pest Act" in 1916. Endowed with that authority, he or his assistants have the right to inspect all importations to which the Act refers.

By mutual agreement with the Dominion Bureau of Foreign Pest Suppression your Inspector undertakes the inspection of certain products entering the Port of Vancouver for points as far east as Winnipeg. He also reports to the Chief of the Bureau of Foreign Pest Suppression at Ottawa importations for other points east of Winnipeg.

Products such as potatoes infested with tuber-moth (*Phthorimæa operculella*) and fruit or vegetables infested with fruit-fly (*Ceratitis capitata*) would be refused entry at Vancouver regardless as to what part of Canada or other points they were consigned.

All nursery stock entering by way of British Columbia for any part of Canada is inspected at the Vancouver Fumigation Station, of which your Inspector has charge.

International Co-operation.

During the latter part of May your Inspector attended the second annual meeting of the Western Plant Quarantine Board held at Salt Lake City, Utah. The Board is composed of a quarantine official from each of the Western United States, New Mexico, the Hawaiian Islands, and British Columbia, your Inspector having the honour to represent this Province.

Questions appertaining to all practical quarantine-work carried out in the several States and Provinces are thoroughly discussed. The Board endeavours to establish a uniform method of procedure and co-operation best suited to the peculiar requirements of the West.

In all probability the next annual meeting of the Board will be held at Victoria, owing to the Hon. Mr. Barrow, Minister of Agriculture, having issued an invitation to that effect.

Miscellaneous.

During the year your Inspector gave talks on local insect pests, plant-diseases, and spraying at the Coqualeetza Institute, Sardis, and to the South Vancouver Horticultural Society. He also judged fruit at the Port Haney Fall Fair.

Markets Branch.

Details relating to Markets Branch work your Inspector was authorized to assume since September 1st owing to the resignation of the Coast Markets Commissioner, R. C. Abbott, H. Gutteridge and A. Irving, of the Coast Markets Branch, Potato Inspectors, were ordered to report to your Inspector of Imports, who was instructed to take charge of the inspection of exports and other duties that had been performed by the Coast Markets Branch. Miss M. F. Lawson, Coast Markets stenographer, resigned on October 13th and was succeeded by Miss Graham as temporary stenographer.

INSPECTION OF POTATOES FOR EXPORT.

A systematic inspection of potatoes for export was undertaken, commencing on October 15th, by which time the potatoes for storage commenced to move. A. Irving was stationed at Kamloops to inspect potatoes being shipped from that point, Savona, Ducks, and Chase. H. Gutteridge was stationed at Ashcroft to inspect potatoes shipped from that point, Lytton, and Walhachin. Mr. Barlow, District Field Officer, was requested to look out for potatoes at Salmon Arm, and Mr. Hunter, with what assistance was available, to look out for Armstrong, Vernon, and Kelowna.

Unfortunately, neither Mr. Barlow nor Mr. Hunter were able to attend to potato inspection owing to other duties taking up too much of their time. E. Hutcherson, of Ladner, being available, undertook the inspection at Armstrong and Vernon. Good work was also done by the Inspectors instructing both growers and shippers to properly grade their potatoes before shipping.

Potatoes inspected and passed for export since October 15th were as follows: Ashcroft, 7 cars; Kamloops, 11; Ducks, 6; Shuswap, 5; Chase, 1; Armstrong, 9; Vernon, 23; Kelowna, 2; Vancouver, 9; making a total of 73 cars, all shipped to the Prairies and Eastern Canadian points. About 12 cars of new crop had been shipped to the Prairie from these districts previous to October 15th.

HOME POTATO MARKET.

Potatoes inspected for the local market were: Ashcroft, 67 cars; Kamloops, 14; Ducks, 12; Shuswap, 8; Chase, 2; Armstrong, 11; Vernon, 35; Agassiz, 1; Vancouver from Fraser Valley and Delta points, 23; Lillooet, 12; making a total of 185 cars. Besides the cars inspected, there were 69 shipped from Lillooet to Vancouver and 18 cars from other points, also 20 moving in other parts of the Province, accounting for 292 cars going into home consumption besides those imported.

It yet remains to be seen if the British Columbia potato-growers were wise in holding to their prices regardless of the United States competition at the commencement of the shipping season. The outlook does not appear very bright, but several things may happen. One thing is certain, and that is our local growers must take more pains in sorting and grading their potatoes for market. Conditions appear to be shaping for the survival of the fittest and those who succeed will have to pay more attention to commercial demand. It has been necessary to resort several cars of local potatoes that would have paid the grower to have been more careful before submitting them for sale.

TOTAL EXPORT OF POTATOES.

Previous to the fall inspection already referred to, 1,686 tons 1,200 lb. were inspected and exported to Eastern Canadian points during the first half of the year, dealing with the 1919 crop. That would bring the total of potatoes exported to the Prairie and Eastern Canada during 1920 to 3,246 tons or 162 cars.

During the first six months of 1920 6,614 tons or 330 cars of the 1919 crop were exported to the United States. During July and August 26 tons of the 1920 crop were shipped to Seattle, Wash., and ½ ton to Hong Kong, China, making a total of 9,886 tons or 494 cars of potatoes exported from British Columbia during 1920.

ONIONS.

Several onion-growers in the Okanagan were as unfortunate with their crop as were some of the potato-growers in parts of the Fraser Valley District owing to excessive moisture during harvest season. This resulted in the Vancouver market becoming very nervous regarding Okanagan onions, and there were several disputes as to the storage quality of certain shipments.

REVIEW OF THE POTATO MARKET.

No doubt many people will criticize the importation of so many potatoes into the Province, and the excuse for such importation is to be regretted. But when we consider the fact that 9,886 tons, valued at $790,880, were exported during the first half of the year, against 9,626 tons, valued at $433,170, imported during the latter part of the year, it is not so bad.

"EGGS MARKS ACT."

Following instructions to continue the enforcement of the "Eggs Marks Act," H. Gutteridge and A. Irving were detailed to collect information and notify wholesalers and retailers that the

Act would have to be complied with. By careful investigation it appeared there was very little to complain of so far as the conditions in Vancouver were concerned. The peculiar condition of the market in the United States tended to maintain a fairly satisfactory state of affairs with regard to our local circulation during the last three months of the year.

The accompanying reports of Mr. Gutteridge and Mr. Irving will give further details regarding work carried out by the Coast Markets Branch during the year.

ALFALFA-WEEVIL.

On April 14th, 1920, by Dominion Order in Council, an embargo was placed on alfalfa-hay originating in the States of Idaho, Utah., and certain counties in the State of Wyoming and Colorado, U.S.A. The reason for such embargo is owing to the danger of importing the alfalfa-weevil into Canada.

Please note reference to alfalfa-hay in Mr. Irving's report. The question of all shipments being accompanied by a certificate of origin has been taken up with Ottawa.

Respectfully submitted.

W. H. LYNE,
Inspector of Imported Fruit and Nursery Stock.

REPORT OF ASSISTANT POTATO INSPECTOR, VANCOUVER.

A. IRVING.

W. H. Lyne,
Inspector of Imported Fruit, etc., Charge of Coast Markets Branch,
Vancouver, B.C.

SIR,—I have the honour to submit herewith my annual work report for the year ending December 31st, 1920, as Assistant Potato Inspector, etc., Coast Markets Branch, Vancouver.

During the first five months of the year potato exports to the United States were in heavy volume and the writer was engaged for the greater part of his time in inspecting export shipments in Vancouver and throughout the Lower Mainland. In addition to these, many storage inspections were made both in city warehouses and in the growers' pits. Surveys were also made of the potatoes held by local dealers with a view to ascertaining whether the supply would be sufficient to meet the needs of the consumers until such time as the new crop became available. Such time as was not spent in the above manner was used in getting market information, prices, supply and demand, condition of produce and any other information that was likely to be of interest to the growers.

During June, July, August, and September exportations to the United States were *nil* and the major part of the time was used in the market-work. Much time was spent in visiting wholesale and retail egg-dealers in Vancouver, warning them of the requirements of the "Eggs Marks Act" and seeing that they lived up to them. During the months of October and November the writer was stationed at Kamloops, where he was engaged in inspecting potatoes for export. The month of December was spent in Vancouver. Market-work was again taken up and greater surveillance made of the egg business with a view to a more rigid enforcement of the Act. Inspections were made and complaints from consumers regarding produce purchased were investigated and adjusted as far as possible. This ended the year's work.

REVIEW OF THE LOCAL EGG SITUATION DURING DECEMBER, 1920.

British Columbia fresh eggs were in good supply during the month. The excess over the local needs found a ready market on the Prairie. The price dropped 3 cents on the 8th of the month. This was caused by a weakening of the Washington market, which made it possible for them to lay their eggs down here at a price below our own.

Towards the end of the month the United States product came over in increased volume and steps were taken by the writer to see that they were properly marked. Visits to the retail establishments were made and it was found that the United States eggs were not being handled through these channels. Further inquiry in wholesale circles was made. It was found that the imported eggs found an outlet through restaurants, hotels, and outside camps, where no marking is necessary. In addition to these outlets there was the Prairie market. Large reshipments were made to this market.

Local retailers do not look with favour on the United States product. The buying public would sooner pay the 2 cents extra to get the British Columbia fresh than take the United States fresh at a lower price. They are poor sellers on the retail market. No doubt the Act, which compels the retailer to show the country of origin with the eggs, acts as a deterrent to their sale. I found that the provisions of this Act were fairly generally observed, and where I found it was not I gave warning and instructions as to its observance. In none of these latter cases did I find any intention to mislead. It was ignorance of the Act.

Shipments of New Zealand and Chinese eggs arrived during the first few days of the month, but were shipped to points outside the Province and had no effect upon the local market.

ALFALFA IMPORTS FROM THE UNITED STATES.

Importation into this district usually starts on or about October 1st and continues on through the winter months. The volume is governed to a great extent by local crop conditions, and the length of the shipping season varies with the length of the feeding season, which may be quite extended by a late spring such as occurred last year. Practically all imports are consumed in Vancouver and the Lower Fraser Valley, as the Interior can take care of their own requirements. The only case where a shipment was sent East was where one was sent to Revelstoke in December.

Up to the time of writing approximately 160 cars have been imported since October 1st. The trade estimates that this will be brought up to 300 cars by April 1st. Under normal weather conditions this date will mark the end of the import season. After April 1st imports shrink to only four or five cars a month and may even go lower than that.

Practically all these imports originate in the Yakima Valley, Wash. Wapato is the chief shipping-point. Wenatchee is also a producing district, but the product from there is viewed with disfavour by the local importers. This is caused by the practice in the Wenatchee District of growing alfalfa as an intercrop in the orchards. During spraying the alfalfa becomes impregnated with the chemical, and in many cases, according to report, cattle fed on such alfalfa have been poisoned.

I could find no instance of alfalfa being shipped to Vancouver from any other State than Washington during the present season. The local market is considered to be low and the high freight rates make its importation from a more distant point improbable.

Importers here obtain no guarantee that the alfalfa is a product of the district from which it is shipped. Invoices usually have attached to them an inspection certificate issued by a Washington trade organization. This certificate is not a certificate of origin. It merely states where the hay was inspected and the finding of the Inspector as to grade. Washington alfalfa is offered to-day at $30 f.o.b. Vancouver in car-lots.

Respectfully submitted.

A. IRVING,
Assistant Potato Inspector.

REPORT OF ASSISTANT POTATO INSPECTOR, VANCOUVER.

H. GUTTERIDGE.

W. H. Lyne,
Inspector of Imported Fruit, etc., Charge of Coast Markets Branch,
Vancouver, B.C.

SIR,—I have the honour to submit herewith a report of my work as Assistant Potato Inspector, etc., Coast Markets Branch, Vancouver, for the year ending December 31st, 1920.

During the first five months of the year ending May 31st the writer was engaged in export-inspection work, principally in connection with potatoes shipped to the United States. Part of the latter two months, April and May, were taken up with potato-seed-inspection work, including instruction on seed selection and disinfection. The months of June and part of July were occupied in enforcing the "Eggs Marks Act"; latter part of July in field-inspection work. August and September were taken up with export shipments of new potatoes and "Eggs Marks Act." October and part of November the writer was employed in Ashcroft and adjacent districts

inspecting export and local shipments of potatoes, including instructions in proper methods of loading and grading for the market. During the latter part of November and December the writer was engaged in inspecting potatoes in storage and securing information as to the local potato situation in Vancouver.

Wholesale and retail dealers in eggs were also visited with a view to the proper enforcement of the "Eggs Marks Act." Marked improvement in the observance of the Act being very noticeable. Owing to largely increased production of local eggs there have been less United States or Alberta eggs offered by the trade than usual. The writer has been unable to find any Chinese eggs offered for sale by retail dealers.

Owing to inspection-work being intimately associated with the interest and welfare of the growers, your Inspector has made use of every opportunity of imparting information and instructions which might be of benefit to them. The year has been a busy one owing to the diversity and scope of the work.

Respectfully submitted.

H. Gutteridge,
Assistant Potato Inspector.

REPORT OF PRAIRIE MARKETS COMMISSIONER, CALGARY.

J. A. Grant.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my report for the year 1920.

The severe frost of October, 1919, had a determining effect on the fruit-crop of 1920. In almost every fruit produced in British Columbia this influence was felt. Prices were exceptionally high during the entire season and were maintained almost to the end of October. Sugar prices were also extremely high until the middle of September, when the first reduction came. The Western fruit production was far below 1919, while the Eastern crop, especially in Ontario, was exceptionally good. Losses in transit on fruit were proportionally less this year than at any former time in the history of British Columbia shipping, due largely to the improved facilities and refrigerator-cars furnished by the Dominion Express Company, and also to the comparative absence of disease in the fruit shipped. There was a noticeable improvement in packing the fruit which was observed and commented upon favourably. Taking the season as a whole, it marks a step in advance for the fruit industry of the Province, in which the Traffic and Credit Association and the Okanagan United Growers took a prominent part.

Public Meetings.

Your Markets Commissioner's activities commenced in Vernon, where an address was delivered to the British Columbia Fruit-growers' Association early in January. A special effort was made to organize the Kootenay District for shipping. Addresses were given at West Robson, Nelson, and Procter. Owing to an outbreak of influenza the Creston meeting was called off. Meetings were held at Okanagan points and Salmon Arm; three meetings took place in Kamloops for organization purposes; information was given at these meetings on what to produce for market and how to pack it. Visits were made to Seattle and Spokane for the purpose of connecting contractors for jam-berries with berry-growers, and in this matter several visits were made to British Columbia jam-manufacturing concerns.

Prairie Season opens.

During April your Markets Commissioner returned to headquarters in Calgary and watched closely the rhubarb situation. The bulk of the early rhubarb which was grown in competition with the British Columbia season came from Walla Walla. It was fully one month after the first Coast rhubarb was offered on the Vancouver market before the first Hatzic car of rhubarb arrived in Calgary. Prices were good in spite of the high price of sugar. In the early season there is a demand for early vegetables on the Prairies, including asparagus, leaf-lettuce, spinach, etc., which could be shipped with the rhubarb early in the season and later. The fast-growing

business in hothouse cucumbers, head-lettuce, and tomatoes could be more economically shipped in the rhubarb-car than L.C.L. alone. The Walla Walla rhubarb-crate is lighter, more air-space, and better all round for rhubarb shipment than the Hatzic crate. The quality of the rhubarb sent from British Columbia is better than the imported stuff. There is a good opening on the Prairie market for rhubarb from April to the end of July, and all early vegetables that can be grown at that time should be included with it.

PRAIRIE MARKETS BULLETIN.

We extended the functions of the bulletin this year by including hay, grain, and feed quotations prevailing on the Prairie. Many inquiries were made to this office as a result and much business done. The featuring of shipping-point prices were also beneficial to growers, resulting in uniform quotations. We included Vancouver market prices for a part of the season. This market will be strongly featured in 1921 bulletins. The closing issue amounts to 2,650. This bulletin was mailed every Saturday at 1 p.m. and should have reached the Coast every Monday morning.

BERRY SHIPMENTS.

Strawberries were a short crop. All car-lot shipments were satisfactory. L.C.L. shipments at first of season from Hammond were sandy and very poor. L.C.L. shipments from Hatzic-Mission were slightly better, but below the car-lot standard. The supply was far less than the demand and record prices were paid for them. One car only was brought in from Spokane; the berries in it were poor quality. Consignment shipments were sold away below the market, partly due to quality and partly due to an apparent desire to lower the price.

Raspberries were also a short crop. The quality was uniformly good and prices were more steady than strawberries. All car-lot shipments reached their destination in excellent condition and a larger proportion were shipped in car-lots than usual. Consignment shipments fell off greatly this year in raspberries.

Blackberries were in demand for a considerable time owing chiefly to the scarcity of strawberries and raspberries; when other soft fruits became plentiful the public tired of blackberries. It is evident that the acreage now planted to blackberries is sufficient to supply the demand.

Loganberries were extremely short in crop and very few reached the Prairies; those that came forward arrived in good shape and netted prices similar to the raspberries. It would be an experiment worth trying to include in each raspberry-car about one-tenth of its contents in loganberries. Very little reshipping was done in berries this year and many Prairie points were unable to get supplies.

Gooseberries came forward in greater volume than the demand warranted. The variety of containers was very trying to the trade. Much loss was experienced in rolling out in transit. The trade would prefer all gooseberries at least three-quarters grown or better.

Black and red currants were short in the first part of the season, but became plentiful towards the last; only a small portion of these were up to standard size. Prices fell off greatly towards the end of their season. The price of sugar was chiefly responsible for this.

Sweet Cherries.—Early Richmonds were jobbed. This variety is not wanted. Tartarians and Royal Annes brought fair returns. Bings and Lamberts came in volume and remained at a high price during their season. Some districts sent in Bings and Lamberts undersized and ungraded; these were jobbed below market prices. Very unsatisfactory returns were made on the bulk of the consignment stuff.

Sour Cherries.—Only a few cars of these came forward, but this few was sufficient for the demand owing to the sugar situation.

FRUIT-CONTAINERS FOR PRAIRIE SHIPMENT.

Strawberries, gooseberries, and currants, 24 deep pints. (The container for all currants and gooseberries should be the 24 deep-pint crate and these crates should have slats placed not more than ¼ inch apart; this would prevent loss in transit.) Raspberries, loganberries, and blackberries, 24 (⅔ quart) shallow hallock; all cherries, 4-basket crate; cucumbers, peach-box; tomatoes, 4-basket crate; cantaloupes, standards (flats not wanted); rhubarb, Walla Walla crate. Uniform crates are helpful in stabilizing prices and the trade prefers the above list.

Stone-fruit.

Plums and Prunes.—This crop was not so prolific as in 1919, especially prunes. The supply was apparently equal to the demand. The 18-lb. case and the 16-lb. suit-case were the prune-containers. All the imported prunes came in 16-lb. suit-cases well filled. It would be worth discussing if the British Columbia crate should not conform with the imported one. The early season in California and Washington gives their plums an advantage over British Columbia. The plum and prune industry as far as British Columbia is concerned would not stand much of an increase at present.

Apricots.—These were in greater demand than the supply. The smaller-sized early varieties were not popular. There is room for an increased volume of the larger sizes. Prices were satisfactory for good-quality apricots. Owing to its perishable nature the apricot should be included with berries in the two-stop privilege allowed by express companies.

Peaches.—The early report that British Columbia peaches were sold out caused Prairie jobbers to seek elsewhere for their supply. Peaches were short in Washington and those having them to offer did so in mixed cars; many were bought in this way, and when the Ontario, Washington, and British Columbia peaches rolled in at the end of the season the market broke under the overload. Correct distribution would have prevented this. The imported peaches were needed at home. Triumph, Early St. John, Crawford, and Elberta are the favourites here.

Crab-apples.

Crab-apples brought good returns. The bulk of them went across the line. If the American market continues to develop an extra planting of Hyslop and Transcendent would be warranted around Vernon and Northern points.

Apples.

Early apples such as Astrachan, Yellow Transparent, and Duchess, were in demand at country points this year and good prices were realized for them. Wealthy and McIntosh sold readily at advance prices. Jonathans that were unpicked before the heavy rains in Okanagan came to grief with water-logging; all escaped that were picked before the rain, and in some non-irrigated districts the trouble did not develop. The only heavy loss this year was taken on Jonathans through water-logging.

Many varieties were found to ripen prematurely, chiefly the Delicious, and considerable shrinkage was noticed amongst Wageners. Storage is light in British Columbia this winter.

Owing to the general fruit-shortage in British Columbia and the abundant crop in Ontario a considerable quantity of Ontario apples were forwarded as far as Regina; very few cars reached Alberta and what did arrive proved very slow sellers. Many apples were bought across the line late in the season where prices equalled British Columbia's, including duty and exchange. In order to secure peaches many apples from Washington were wished upon the Prairie jobbers, as these cars were intentionally loaded with part peaches that were in demand, the balance to apples which were not wanted. Later shipments heavy to Winesaps, which were short of the demand, were bought to secure the Winesaps. The chief reason for increased importation was the shortage of the British Columbia crop. The Prairie farmers are co-operating with us and buying our apples freely, and a friendly feeling exists between the farmers of the Prairie and British Columbia farmers. Considerable co-operative business is now being done between their organizations.

Celery.

Armstrong celery continues popular all over the Prairies. This year an increased production was easy to take care of. More British Columbia celery was sold in Alberta this November than at any previous time, and for the first time completely shut out California celery.

Potatoes.

Potatoes were scarce throughout the continent and prices up to $140 per ton were obtained. High prices lasted until the new crop was fairly well matured. Increased freight rates and a fair local crop in the Prairies, together with taking the duty off potatoes going into the United States, all helped to curtail British Columbia shipments to the Prairies. The exceptional low grade of interior potatoes has been an adverse factor to heavy shipments. Prices have dropped to below the cost of production, with little prospect of any advance before the next crop comes

in. Want of organization amongst potato-growers prevents this industry increasing in British Columbia. Lack of a uniform grading law makes dealing in British Columbia potatoes a gamble. This condition will right itself when the grading law becomes effective.

ONIONS.

Onions were small in size and owing to the wet fall were not well cured. Little or no grading was done. Walla Walla ships three grades and Winconsin shipped graded stock. The Prairie market used many imported onions and a lot from Ontario. The price was as reasonable from outside points and the grades and quality usually superior. British Columbia growers and shippers will learn to their cost that they will have to give more care to the grading and curing of their onions. Vancouver City imported many cars of American onions right in our shipping season for the same reason.

TOMATOES.

The hothouse-tomato industry is gradually extending and improving and it has reached large proportions. Prices have been satisfactory.

A little earlier ripening date at start is desired by the trade. Field tomatoes from the South bring the demand for hothouse tomatoes to a hurried finish. The volume is usually greatest when the Southern field stuff arrives. An earlier start would mean a longer season. British Columbia field tomatoes were overdone last year. The quality from Vernon, Kelowna, and Summerland needs much improvement; they are too large and coarse at peak of season; these broke the market for well-selected stock from Kamloops and Keremeos. The field tomato will not be a staple on the market until the necessary care in selection is given. The lack of standard and grade is very evident. Shipping associations will require to have rigid inspection at shipping-point on all commodities shipped. The big shipping concerns are equally guilty in this respect with the small shipper. Orientals do a lot of the packing in the field and no supervision has been exercised over them; if this is not changed much loss in trade will result.

CUCUMBERS.

Hothouse cucumbers arrived in volume and of excellent quality; high prices ruled for them. An earlier start under glass would make for a more satisfactory season. Field-grown cucumbers crowded out the hothouse stuff before the vines had passed the peak of bearing. Field cucumbers improved over other years, but still the need of better selection is great. A few careful shippers are hurt in their shipments by the volume which is inferior in grade and selection.

CANTALOUPES.

The British Columbia grown cantaloupe was rather late on the market. The American imports were heavy and continued in competition during the British Columbia season. Owing to the short distance to ship British Columbia cantaloupes the standard crate is favoured. Large and small sizes are not good sellers; the best sellers are 33, 36 to 45; 27, 54, and 64 are hard to sell.

GENERAL.

Since October prices in all field products have declined, with little chance of increasing until the 1921 crop comes in.

During the early part of August your Markets Commissioner made a flying visit to Toronto in the interest of the apple deal, and during the short stay there the first advance sale of British Columbia apples was made. A brief visit was made to Hamilton, Ont., where Mr. Wagstaffe was interviewed *re* berry contracts. After making acquaintance with fruit-dealers in Cleveland and Pittsburgh the Chicago International Shippers' Convention was attended and British buyers interviewed. Milwaukee, St. Paul, and Minneapolis were visited and the exact market situation canvassed. It was evident from the extra size of the Eastern crop that Western sales would be seriously affected, and such proved the case. British Columbia apple-growers sold early and most of them to better advantage than their Southern competitors. During the shipping season rush visits were made to Winnipeg, Regina, Brandon, Saskatoon, Moose Jaw, Edmonton, Medicine Hat, and Lethbridge, and matters of adjustment and selling-prices discussed. From a marketing standpoint the 1920 season was a record in price-getting and the improvement made by British Columbia packers and shippers was favourably commented on everywhere.

This year saw a few more British buyers in our valleys. The Manchester and Scottish Co-operative Societies, as well as several of the leading wholesale dealers in fruit, looked over the prospects. Shipments were less to Great Britain owing to crop conditions.

During the season many inquiries were made at the Calgary office for general information on land settlement in British Columbia; especially was this noted in regard to lands along the Grand Trunk Pacific Railway. We secured a stock of literature on this question and were able to furnish bulletins on application. The British Columbia Fruit Booklet continues popular; this office sent out over 1,000 copies last season.

Several packing-houses have been built in the Kootenay District and more are needed. Transportation now furnished by the Canadian Pacific Railway from Arrow Lake points is very poor. The policy that favoured British Columbia shippers in advance selling would appear to have reached the reacting stage. Jobbers are likely to resort to buying on the market at shipping-time, because in most cases advance buying has been unprofitable to them. Much harm is done to distribution by the policy of some British Columbia shippers in issuing price-lists, quoting prices to the retail trade; while, on the other hand, advertising by jobbers for consignments from producers has resulted in undermining the market prices.

The financial and industrial outlook is at present very uncertain. The sugar situation has again righted itself and the low prices now quoted have caused much loss to canners who preserved fruit when prices of both fruit and sugar were very high. The public are anticipating cheaper fruit and sugar and are holding off their buying; this condition will reverse the marketing of berries from the policy of the past two years, which enabled the producers to set the price of fresh fruit by the prices paid at factories. It looks now as if the jam prices would be set by the demand from the Prairies for fresh fruit. The great increase in acreage over other years and the fine growth of the plants indicate a bumper berry-crop for 1921. This branch is doing all possible to facilitate a greater distribution all over the Provinces of Manitoba, Saskatchewan, and Alberta, also encouraging wholesale grocers to stock sealers and containers for jam-making by housewives. Owing to high prices above referred to this has been neglected by most of them for several years. An advertising campaign in the berry season may be needed in emergency this season to stimulate a greater home canning and preserving of berries. There is every indication that the Market Branch will be taxed to its capacity in distribution and marketing. Prices will rule considerably lower than in the past two seasons. When canners have overtaken the slump effects the market outlook for berries will again be bright.

It would be in the interest of both shippers and jobbers to work more closely together, as both are in a position to help themselves and secure better distribution by unity. During the season now closed this Branch has had the energetic co-operation of both Provincial and Dominion officials in the Horticultural and Fruit Branches. We hope for a continuance of this support.

Respectfully submitted.

J. A. Grant,
Markets Commissioner.

REPORT OF LIVE STOCK COMMISSIONER, VICTORIA.

W. T. McDonald, M.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith the annual report for the Live Stock Branch for the year ending December 31st, 1920.

General Conditions.

The winter of 1919–20 was extremely long and necessitated an unusually long feeding period. Hay was scarce and high-priced and a considerable number of cattle were lost because proper care was not afforded. The hay situation generally, however, was relieved by the removal of the duty and the payment of one-third the freight by the Provincial Government.

Labour in the rural districts has continued scarce and high-priced, but during the last two or three months there are indications of a decided change, with the expectation that during

the coming year sufficient labour will be available for the farms. During the past few years those seeking employment have shown a tendency to congregate in the towns and cities, where until recently sufficient work at good wages was available. While there is little tendency as yet to leave the towns and cities, we feel confident that by next spring labour on the farms and ranches will be looked upon with greater favour by those seeking employment.

Early and almost continuous wet weather, beginning during the harvesting period, caused a large loss, particularly in the Lower Fraser Valley. In many cases farmers lost almost their entire grain-crop, and it has been estimated that nearly 50 per cent. of the grain-crop of the Delta and Luka Island Districts was rendered unfit for use. In certain districts where large quantities of slough-hay are usually harvested the wet weather of the past season limited operations to a great extent. With the exception of a few flooded areas, however, the cultivated hay-crop produced satisfactory yields.

In spite of the fact that many of the cattle in the range districts were in thin condition in the spring, the summer and autumn were favourable, and in the areas visited this autumn the cattle were found to be in excellent condition. Unfortunately, however, the beef market was extremely dull and much stock that the owners had to sell, particularly in the Chilcotin and Cariboo, has not been disposed of. Fortunately, up to the present time the weather has been mild and the indications are that the cattlemen will go through the winter in good shape in spite of the fact that many of them are carrying more cattle than was anticipated.

During the past year your Live Stock Commissioner has endeavoured to personally visit as many of the farmers in various sections of the Province as opportunity would permit. In this matter efforts were made to particularly visit districts and farms not previously visited. In the Kamloops District several trips were made in conjunction with Geo. C. Hay, District Agriculturist. An interesting trip was made through the East Kootenay and Boundary Districts with W. Newton, Chief Soil and Crop Instructor. Nearly all of the farmers in the Upper Columbia Valley were personally visited on their farms and their problems discussed with them. One object we had in mind was that of ascertaining existing conditions in relation to the possibility of establishing a creamery at Golden or some point farther south. After a very careful investigation of the whole situation it was concluded that there was not a sufficient number of cows to support a creamery, nor was there sufficient interest on the part of the farmers of the district at the present time. It is hoped, however, that this district will in the near future be in a position to support a creamery. Through this section of the Province a considerable interest is being manifested in dairying, while in the Windermere District beef cattle are of chief interest. In the Cranbrook District varying conditions are to be found. The majority of farmers are handling a limited number of stock, while a few are operating on a more extensive scale. Here one is impressed with the amount of summer range available, with a contrasting scarcity of winter feed. A balance can only be arrived at and maintained by the development of irrigation projects. Through that section of the Province from Grand Forks to Princeton we found considerable interest being taken in proposed development along the line of dairy-farming. Grand Forks has a privately owned creamery, which reported a steady growth in the amount of business handled. This plant is shipping cream for considerable distances and from as far west as Princeton.

For some time prior to our visit to Princeton plans were discussed for the establishing of a local co-operative creamery. Here, also, we found that conditions were not opportune to take the step that had been proposed. There are not sufficient dairy cows in the district at the present time to supply a creamery with sufficient cream, while, on the other hand, two markets are available in addition to the local sweet-cream dairy—one, the creamery at Grand Forks, and the other, the various dairies in the City of Vancouver. After a thorough discussion with the people of the district who were interested, it was unanimously decided that it would not be wise to attempt to operate a local creamery at the present time.

HORSES.

There has been a very fair market for draught horses during the past year until within the past two or three months, when the general closing-down of practically all logging camps in the Province threw a surplus of horses on the market, with a depressing influence. At the same time a certain amount of railway-construction work was completed or closed down for the winter months, which had a tendency to accentuate the conditions already prevailing.

Jack of Elmurlin, No. 1415-c, 27755-A (7 years old). Sire, Glen of Maple Bay. Dam, Imp. Dentonia's First Joy. Imported from England by Mrs. Massey, of Toronto. First prize and grand champion, Vancouver and New Westminster, 1920.

Orchard scene, West Arm of Kootenay Lake.

Okanagan Valley. Irrigated orchard showing method of using furrows.

Throughout Canada there is a surplus of horses that would be classed as light and general purpose, and for such there is very little market. The light horse has suffered seriously in competition with motor transportation. The tractor and motor-truck have had the advantage of extensive advertising on the part of manufacturers, while horses suffered to a corresponding degree thereby. There is at the present time, however, a tendency to replace tractors and trucks with horses under certain conditions, and this is particularly true in farming operations. The tractor is conceded to be valuable to take what might be called the "peak" load on large farms, but in general farming operations the horse is more economical. A more plentiful supply of farm-labour will also militate against the tractor, for which it was claimed that a certain amount of work could be done with fewer men, and this was looked upon as a strong argument when labour was very high-priced and often difficult to get at any price. Recently we have had inquiries regarding stallions from several districts, which doubtless may be taken as an indication of a revival of interest in the horse-breeding industry.

In so far as the apparent immediate future of the industry is concerned, breeding of heavy horses should be mainly encouraged. Even in the breeding of draught horses there has been a tendency in recent years to sacrifice size for quality to too great a degree. We would not imply that quality is not important, but it should be remembered that size is also important, and judges at our fairs should emphasize size to a greater degree than is usually done in the breeding classes.

Particularly in Clydesdales, some very excellent animals were shown at a few of the fairs in the Province this year. A number of excellent female classes were shown, but it was to be regretted that so few really first-class stallions were in evidence.

CATTLE.

In travelling about the Province it is pleasing to note the interest that is being taken in pure-bred beef and dairy cattle and also the increasing desire to use pure-bred sires. The Windermere District may be given as an example of what is being accomplished. A few years ago there were practically no pure-bred bulls in this district, while to-day, through the instrumentality of a Live Stock Association, nearly all of the bulls on the range are pure-bred. The consequent improvement of the stock is most decided. Another factor which is proving of value from an educational standpoint is the Winter Fat Stock Show held at Invermere.

At Kamloops on July 1st the Shorthorn and Hereford breeders formed Provincial associations, which doubtless will prove important factors in the development of the beef-cattle industry. A number of pure-bred beef-cattle herds are being established in the Kamloops, Okanagan, and Nicola Districts.

The dairy-cattle industry is in a very healthy condition and the Provincial Holstein-breeders' and Jersey-breeders' Associations have been active in developing their respective breeds. A number of new Jersey herds are being established on Vancouver Island, and during the month of June the Jersey-breeders' held their annual meeting at Duncan and visited all of the Jersey herds in the district, which is now becoming an important Jersey-breeding centre. The Holstein-breeders held their annual sale at New Westminster on December 10th, when a very fine lot of animals were sold at auction. Considering the quality of the animals offered, the prices realized were rather low, but in view of the existing financial conditions the consignors felt satisfied. During the year pure-bred dairy animals bred within the Province were shipped to Australia, New Zealand, and China.

The active measures taken by the Province to control bovine tuberculosis has made British Columbia attractive for prospective purchasers. Probably in no other part of the continent are pure-bred herds as free of this disease as they are in British Columbia. In this connection it is gratifying to note that much support is being given to the Dominion "accredited herd" system, but we regret that the Dominion Government does not feel justified in taking any further steps in controlling bovine tuberculosis owing to the greatness of the problem and the apparent lack of interest on the part of the majority of cattle-breeders throughout Canada. The conditions at present are such that British Columbia doubtless will maintain a very advanced position for a number of years to come and during that time should develop an excellent export trade in pure-bred cattle. Reports from the Edmonton and Calgary stockyards indicate considerable shipments of breeding cattle into this Province, and particularly to those areas tributary to the Grand Trunk Pacific and also to the Peace River Block. While these cattle are mostly for

beef production, a considerable number of dairy cattle have gone to the Nechako and Bulkley Valleys. In both of these districts pure-bred herds are to be found.

It has previously been mentioned that there is a growing tendency to use pure-bred sires, but in many of the outlying districts the scrub is altogether too much in evidence. Even in the older portions of the Province he is to be found more frequently than would be expected. Considerable educational work is being conducted by the Live Stock Branch for the purpose of pointing out the folly of using inferior sires, and it is gratifying to note that the appeal being made is meeting with considerable response.

SWINE.

Owing to the high cost of grain and mill-feed there has not been the usual interest in the breeding of hogs. This fall, however, we are again receiving considerable inquiries for breeding stock which comes as the result of a decline in the cost of feed. Until the price of grain began to drop there was a tendency upon the part of owners to reduce or disperse some of the best pure-bred herds, but we are confident that farmers will be encouraged to maintain more pure-bred stock. During the period of high-priced grain it was difficult to secure a sufficient premium for pure-bred breeding stock to encourage breeders to stay in the business. We have at all times encouraged the use of pasture crops in conjunction with grain-feeding to lower the cost of pork production, and by following this method many have found that pork could be produced at a profit.

Unfortunately, there was a severe outbreak of hog-cholera in the Okanagan Valley during the months of October and November and a number of farmers suffered very heavy losses. The outbreak has now apparently been controlled and it is hoped that there will be no further losses.

SHEEP.

The sheep and wool market has suffered a serious depression and some of our larger flocks have been reduced or dispersed. To offset this, however, a considerable number of sheep have been produced in the various portions of the Province, and so far the industry has suffered no set-back so far as numbers are concerned. A large percentage of the 1920 wool-clip was shipped to the Canadian Co-operative Wool-growers, Limited. While there has been difficulty in disposing of wool at any price, the Canadian Co-operative Wool-growers have been very successful as compared with similar organizations in the United States, and it is expected that in the near future all their holdings will be disposed of.

It is interesting to note that during this year a woollen-mill has begun operations in Vancouver under the name of the Canada Western Woollen Mills, Limited. The company experienced considerable difficulty in securing delivery of machinery, the last of which was not installed until October, although it was expected early in the year. The chief articles of manufacture are blankets, coating materials, and a certain amount of tweeds. The employees are about twenty-two in number. The goods manufactured are of excellent quality, and the manager, who has had extensive experience in the east, claims that the conditions on the Coast are very favourable. The climate and quality of water are two important factors in the operation of a woollen-mill and at Vancouver the above have been found to be ideal.

AGRONOMY CONFERENCE.

On March 11th and 12th a conference was held in Vancouver for the purpose of deciding, if possible, the best varieties of various field crops to recommend. Those present at the convention were: R. H. Helmer, Superintendent of the Summerland Experimental Farm; W. H. Hicks, Superintendent of the Agassiz Experimental Farm; P. A. Boving, Professor of Agronomy, University of British Columbia; Geo. Boving, J. Newton, and G. G. Moe, of the Department of Agronomy, University of British Columbia, and your Live Stock Commissioner. While other questions were discussed, the one above referred to was the principal problem dealt with. While L. Stevenson, Superintendent of the Sidney Experimental Farm, was unable to be present, the findings of the convention were afterwards discussed with him and the results of his experiments taken into consideration in the final draft of the proceedings.

Wheat.—It was decided to recommend the following varieties of wheats, with special emphasis on Red Fyfe: Red Fyfe, Marquis, and Huron. When wheat is grown only for feeding purposes the White Russian variety to be recommended, while bluestem was to be made the

subject of further tests in view of the possibility of it proving suitable for certain sections of the Province.

Oats.—It was decided to recommend the American Banner oat as a main crop, with close attention to the Victory (Seger) variety. For the Interior, including the Kamloops District, and the southern part of the Okanagan, it was decided to recommend the Daubeney as well as the Banner and Victory (Seger) varieties.

Barley.—It was the decision of the meeting that the Chevalier barleys should be recommended and that the Manchurian be recommended where late seeding was necessitated.

Peas.—The Solo and Arthur varieties have been outstanding at the Sidney Experimental Farm.

Vetches.—The common spring vetch was recommended for spring and autumn planting on the Coast and Island Districts. The hairy vetch was recommended for use where weather conditions do not favour the common vetch.

Corn.—For silage it was agreed to recommend North-west Dent for beginners and for districts requiring earliness, Longfellow and Golden Glow for experienced growers and long-season conditions, and Quebec Yellow 28 when corn was being grown for grain.

Mangels.—Yellow Intermediate was recommended, with the Yellow Ovoid a close second and even better on shallow soil. Golden Tankard variety was recommended for late spring feeding, more on account of outstanding keeping qualities than on account of yield. Among sugar-mangels, which are particularly good for hog-feeding, the Rosy S.M. was considered the best.

Swede Turnips.—The Bangholm, the Magnum Bonum, Canadian Gem, and Hall's Westbury were recommended.

White Turnips.—The Imperial Green Globe was agreed upon as being the best from the standpoint of both yield and keeping qualities.

Field Carrots.—It was decided to recommend the White Intermediate and Short White Vosges.

Grasses and Clovers.—It was decided to recommend the inclusion of tall oat-grass, orchard-grass, and meadow-fescue, together with the ordinary clovers and timothy in all mixtures for all conditions and pasture purposes.

Potatoes.—The following were the varieties considered as being superior: Early, Early St. George and Epicure; medium early, Irish Cobbler, Early Rose, and Early White Prize (Surprise); main crop, Carmen No. 1, Gold Coin, Eureka, Green Mountain (for the Okanagan), Empire State, Up-to-date, and Burbank (the latter for moist or irrigated land).

Dry-farming Stations.

A detailed report of the Quilchena Dry-farming Station will be found in the report of Geo. C. Hay, District Agriculturist at Kamloops, which is being submitted herewith.

The Department decided to close the Dry-farming Station at 105-Mile House, and according to the plans made the live stock and implements, machinery, grain and hay crops were sold at public auction on October 15th. The prices obtained were satisfactory and a detailed report of the sales has previously been submitted.

Boys' and Girls' Clubs.

In addition to the work conducted, the work of the Boys' and Girls' Clubs has been extended during the past year by arranging with the British Columbia Jersey Cattle-breeders' Association to include clubs for the raising of pure-bred heifer calves. It is probable that Provincial associations representing other breeds will wish to co-operate in this line of work.

Brands.

During the year 1920 375 new horse-brands and 534 new cattle-brands were issued, while 421 horse-brands and 500 cattle-brands were renewed. Eighty-five hide-buyers' licences were issued. A great deal of work has been done in revising the brand records with a view to eliminating conflicting brands.

Fairs.

Probably the most outstanding feature of the live stock exhibited at our larger fairs during the year 1920 as compared with other years was the marked improvement in the fitting and condition of the animals exhibited. Not only has this made the live-stock departments of our

fairs more attractive, but also increases the advertising value of fairs, both from the standpoint of the individual exhibitor and the breed which an animal represents. Your Live Stock Commissioner officiated as judge at the three larger fairs, judging all classes of horses at Vancouver, where an excellent horse-show was held every evening of the week, sheep and cattle at Victoria, and Jersey and Guernsey cattle at New Westminster, and also acted as Superintendent of the Horse Department at the Victoria Exhibition.

The Pacific International Live Stock Show held at Portland is making wonderful progress and proving a strong factor in live-stock development of the Pacific North-west. During the recent show Shorthorn cattle and sheep were exhibited from British Columbia and efforts were being made to encourage all breeds to exhibit. Not only is the show an advantage in advertising the live stock for the exhibitor, but also is of immense value from an educational standpoint in stimulating both exhibitors and visitors to greater effort in the breeding of improved live stock.

During the past year it has been my privilege to judge at fairs in Calgary and Edmonton. Not only has this afforded an opportunity of keeping in touch with pure-bred live stock and live-stock conditions in the Prairie Provinces, but also has furnished an opportunity of meeting many breeders of pure-bred stock who are considering moving to British Columbia for the purpose of carrying on the breeding of live stock. Some breeders already have moved from the Prairie Provinces to farms in British Columbia, bringing with them excellent pure-bred stock, while a number of others are considering doing likewise.

PURE-BRED SIRES.

The Department has continued its policy of supplying pure-bred sires to Farmers' Institutes on easy terms of payment. This work has resulted in great benefit not only in furnishing pure-bred sires to the various institutes that have taken advantage of the plan, but also has served to stimulate interest in the value of improved live stock. Whenever and wherever opportunity afforded, the campaign is being conducted for the purpose of eliminating the scrub or grade sire, and many gratifying results have been observed, although much yet remains to be done.

BRITISH COLUMBIA STOCK-BREEDERS' ASSOCIATION.

The year just closing can be considered a satisfactory one for the British Columbia Stock-breeders' Association, and it has been interesting to note that there has been many more applications for assistance in connection with transportation charges on pure-bred stock purchased by the members of the association, thus indicating increased development of the breeding of pure-bred animals, the results of which will be reflected in the improvement of the live stock of the Province.

The association has this year held its second annual bull-sale at Kamloops, where on March 10th 105 animals were sold for $20,922. These sales are proving to be a marked success and without a doubt will be a great factor in the cattle-breeding industry of British Columbia. Not only is opportunity afforded for bringing buyer and seller together, but the market thus afforded encourages the breeding of pure-bred animals.

The Western Canada Live Stock Union, with which the British Columbia Stock-breeders' Association is affiliated, has been a very influential organization in dealing with problems relating to the live-stock industry of Western Canada. A most successful convention of the Union was held in Calgary on December 15th and 16th, at which your Live Stock Commissioner was honoured by being elected Vice-President for British Columbia.

GENERAL.

The interest in milch-goats still continues. While a considerable number of first-class breeding animals have been imported from the United States, the total number in the Province at the present time is approximately 5,000.

In addition to Mr. Hay's report, I am submitting herewith the reports of J. R. Terry for the Poultry Division, and also the report of R. J. Ferris, Silo Demonstrator.

Respectfully submitted.

W. T. MCDONALD,
Live Stock Commissioner.

REPORT OF CHIEF VETERINARY INSPECTOR, VICTORIA.

Dr. A. Knight, V.S.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit the report of the Veterinary staff for the year ending December 31st, 1920.

At the outset I may say that a good deal of time was spent on tuberculin-testing of animals with regard to purchase by the returned soldiers. This work has encroached a good deal on our regular programme of testing cattle on the premises of the farmers of the Province. Most of these requests were for tests of single animals, and although considerable expense and time was spent, a corresponding showing of the work accomplished does not appear in a report of this nature.

Actinomycosis.

A number of cases were reported by the stock-owners both under range conditions and dairy-farms. The disease is not widespread in this Province and does not occasion any concern. The few cases reported were dealt with by our Inspectors principally by advising the owners to slaughter the animals, as the cases so reported were chiefly advance or open cases and did not admit of treatment. In the case of preliminary actinomycosis, however, iodine treatment appeared to be satisfactory.

Goitre.

Goitre among our domestic animals, especially those of the Bulkley and Nechako Valleys and Pemberton Meadows, appears to be occasioning some concern among our stock-breeders. Along the Bulkley Valley considerable losses were reported among calves, sheep, and colts; while a number used the iodine treatment, yet apparently failed to obtain results that would be expected. On inquiry, however, I find that the iodine treatment was not administered regularly, and probably it is from this neglect of it that good results were not obtained. Where the treatment was consistently followed I believe good results were generally obtained. On observation and in communication with parties in the Pemberton Meadows, where the iodine treatment has been in vogue for some three or four years and administered in a proper manner, good results have always been reported. Apparently this treatment is also being used to some extent among humans in the Pemberton Meadows and good results apparently follow.

Hæmorrhagic Septicæmia.

A few outbreaks of this disease have come to my notice, chiefly amongst young stock. The cases were reported from Alberni, Valdes Island, Saturna and Saltspring Islands, Metchosin and Sidney. The removal of the remainder of the young stock to higher pasture and isolation of affected animals prevented any further loss. Outbreaks of this trouble appear to occur under unusual weather conditions. The onset of the disease is so rapid that medical treatment appears to be of no avail. The animals as reported to this Department were apparently calves up to 1 year of age. This disease is not widespread in this Province and appears to confine itself to small outbreaks.

Pigs and Sheep.

No diseases affecting sheep were reported to this Department during the past summer outside of the ordinary catarrhal trouble, which is not at all serious in this Province. In a few cases of pigs that were reported, on inspection internal parasites appear to be the cause; the ordinary remedies were prescribed and no serious losses appeared; the affected pigs fully recovered. In this connection copper sulphate was found to be most effective.

Plant-poisoning.

Plant-poisoning has apparently caused considerable loss, more especially in the northern section of this Province. From reports received, symptoms of animals that have died would indicate that water-hemlock was the chief source of poisoning. A number of specimens of plants, portions of stomach and contents sent into the office by owners of stock which they had

lost proved to be water-hemlock; also the condition of the stomach would indicate poisoning by this plant. Plant-poisoning is assuming rather large proportions in the northern section; no doubt such widespread poisoning is due to the native grasses being eaten too close; this necessitates the animals feeding on other plants. This trouble, to my mind, will no doubt rectify itself to some extent when the country is brought under more domestic conditions and domestic pastures are made available.

INFECTIOUS ABORTIONS.

By letters received by this Department this disorder appears to be widespread throughout this Province. Sterility which may be the after effects of abortion is also very prevalent. In a number of districts whole herds appear to be affected with some form of this malady. To treat these cases systematically it will require the attention of several veterinarians who are qualified to perform this work and devote practically the whole of their time to treating such cases. As we find this disorder more or less prevalent among range cattle, it would be practically impossible to follow the line of treatment which is more or less successful in dairy herds. Isolation and disinfection of infected animals and premises would be the only line of treatment that could be followed under range conditions. It has been noticed also that the disease in the herd is controlled in exact ratio to the amount of precaution, sanitation, and disinfection adopted.

TUBERCULOSIS.

During the year the Veterinary staff has been devoting its time to testing cattle, largely by request of owners; more particularly is this true of requests sent in by the Soldier Settlement Board, which requires all cattle to be tested prior to purchase. This has necessitated much time being spent on the road, travelling from one district to another, testing isolated cows. This has also incurred considerable expense and time. During the year the staff has visited 2,409 premises, tested 17,071 head of cattle, and found 732 reactors. There remains at present thirty-nine reactors in quarantine and eleven suspects. The great majority of these animals in quarantine were tested the last days of the old year and will be disposed of shortly. We have been endeavouring to devote most of our time to cleaning of the herds where reactors were found on previous tests. It is in such herds that we still find the largest percentage of reactors, and I hope by repeated tests to be able shortly to reduce or clean these herds entirely of diseased animals. The Okanagan District is apparently free of tuberculosis. This may also be said of the Columbia Valley and the Kootenays. In the Columbia Valley a few cases were found in cattle imported from Alberta. The Gulf Islands are also free of this disease; also in certain sections of the Lower Fraser we found a decreasing number of tubercular cases. I herewith append a list of the districts covered by your Inspectors, giving the number of premises, cattle tested, and reactors found in each district. (*See* Appendix No. 20.)

INSPECTION OF DAIRIES AND STABLES.

Your Veterinary Inspectors report that the sanitary conditions of dairies and barns show a slight improvement. This is more noticeable in those districts where the old buildings have passed their usefulness and new stables have been erected, the tendency being to erect stables with modern sanitary conveniences. We find an increasing number of stables and dairies coming under Class A. No doubt when labour and price of building material come down to normal conditions we will see an increasing number of new stables and dairies built. Your Inspectors endeavour to work in conjunction with the Medical Health Officers of the various municipalities in connection with the inspection of dairies, stables, and milk-utensils. The medical officers especially of our larger cities are insisting that the dairymen supplying milk to these cities furnish them with a certificate of tuberculin testing and the grade of their premises. Some little time was spent by a number of your Inspectors in acting as judges at the fall fairs and also in securing breeding animals for Farmers' Institutes. It is of interest to know that dairymen and stock-breeders are realizing the importance of using good sires to head their herds and flocks. There continues to be an increasing demand for pure-bred animals of all classes.

Respectfully submitted.

A. KNIGHT,
Chief Veterinary Inspector.

REPORT OF SOIL AND CROP DIVISION.

W. Newton and C. Tice.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—We have the honour to submit herewith the annual report of the Soil and Crop Division.

Reorganization.

The work of the Soil and Crop Division during the past year has been handicapped owing to the absence of officials. On March 24th, 1920, C. Tice took over the duties of Soil and Crop Instructor. The writer did not take charge of the Division until June, 1920. Reorganization-work has therefore occupied considerable of the time of the officials of this Division.

Leave of Absence.

From September, 1919, to June, 1920, leave of absence was granted the present head of the Division for the purpose of conducting soil- and crop-research work under the auspices of the University of California, Berkeley, Cal. Owing to the similarity of many of the field problems in California to those of British Columbia the location proved very favourable. Acknowledgment is gratefully given to a number of the staff of the University of California for the assistance given while in California and also for the promise to co-operate with this Division when they may be of assistance. Besides soil and crop research, time was taken to investigate some of the successful co-operative organizations of that State. Such information is of value to a department that has seen fit to encourage co-operative agricultural endeavour as a means of improving the position of the farmer of British Columbia. For this purpose, and to become familiar with the problems of the farmers rather than those of the laboratory, a motor trip was arranged through most of the districts of Northern California.

Soil Investigations.

An arrangement has been made with the Department of Mines to undertake the chemical analysis of soils when such analysis is approved by an official of this Division. It is not generally recognized by the average farmer that an analysis of a soil from a chemical standpoint is of little value unless the instructor who interprets the results is familiar with the physical character of the soil, drainage conditions, and many other factors that influence the productiveness of soils. For the purpose of securing the information necessary to recommend remedial soil-management methods a laboratory was equipped for the purpose of examining the physical characters of soil samples before being analysed for their chemical constituents. Furthermore, whenever possible the field conditions are examined. It does not follow that because a soil has a plentiful supply of the four elements frequently lacking—namely, nitrogen, phosphoric acid, potash, and lime—that large crops will be produced. Poor drainage conditions, lack of humus, a subsoil of hard-pan or gravel, or other physical defects may account for the poor yields. For this reason the officials of this Division attempt to gather as much field data in relation to soils as time allows. For the same reason the practice of forwarding soil samples for analysis is discouraged unless the sample has been taken under the direction of this Division.

Lectures.

Lectures relating to soil-management and crop production have been given at various points in the Province. When it can be arranged the policy of this Division has been to spend sufficient time in the district where the lecture has been applied for in order to become familiar with the local problems relating to the subject to be discussed.

Correspondence.

Owing to the wide range of climatic and soil conditions in this Province it has been found difficult to deal with many problems in relation to soils and crops by correspondence. For this reason the Division is attempting to gather and classify local data in regard to soils and climatic conditions and also the adaptation of certain crops or varieties to definite locations. Any information of this nature will be gratefully received by the officials of this Division. We desire to emphasize to any one desiring information in reference to soil-management or crop production to clearly describe the location of the farm to be dealt with. Resulting from our efforts to furnish accurate and useful information, the amount of correspondence is steadily increasing.

DRAINAGE.

The value of underdrainage at many points in the Interior of British Columbia to prevent the spread of alkali has been emphasized by this Division. In many of the irrigated districts there is a distinct danger that areas will become unfit for crop production unless more attention is paid to underdrainage. The value of underdraining as a means of increasing crop yields is rapidly becoming recognized in the Lower Mainland and Island Districts. When possible to arrange, the Soil and Crop Division undertakes to advise as to a system of drains most suitable. Time has prevented the Division from undertaking many detailed drainage-surveys. In a number of cases the information obtained from rough surveys was sufficient to outline a definite drainage system. Many farmers who desire to install drains have not had previous experience in drainage operations. Furthermore, they do not possess the accurate instruments that are necessary for taking levels. The assistance given by this Division is consequently appreciated.

UNITED EFFORT.

Officials of the Soil and Crop Division have felt that in order to obtain the maximum returns for money and energy expended outside assistance was necessary. An unofficial agreement has therefore been made with Federal and British Columbia University officials engaged in similar work to exchange information that might prove of mutual benefit. The agreement not only prevents overlapping, but makes the work of the small staff of this Division more effective.

VISITING FARMERS.

Many farms have been visited during the past season by the officials of this Division. This phase of our work takes considerable time, but when the farmers' problems are discussed in the field rather than from a platform more useful information can frequently be given.

NITRO-CULTURE DISTRIBUTION.

From time to time inquiries were being continually received in the office of the Soil and Crop Division regarding cultures for inoculating seeds of the legume family. Since inoculation of the seed is one of the essential points in obtaining good catches of alfalfa, clover, etc., it was considered wise to have the more important cultures—namely, alfalfa and red clover—on hand for distribution. Accordingly, cultures were obtained from the Bacteriological Department at Guelph, Ontario. These cultures are now being distributed to those who require them at the cost price of 25 cents. Full directions for using these cultures are enclosed with each bottle.

This year over fifty cultures have been sent out. In order to ascertain if farmers were obtaining favourable results from the use of these cultures a questionnaire was sent out this fall to those purchasing cultures. In answer to the question, "Do you consider the inoculation of the seed beneficial?" seventeen out of eighteen responded in the affirmative; the other one did not answer. It will therefore be the policy of this Division to continue distributing cultures.

JUDGING AT DISTRICT FAIRS.

During the month of September officials of this Division acted as judges at the following agricultural fairs: Langley, Cloverdale, Coquitlam, New Westminster, Vancouver, Victoria, Chilliwack, Whonnock, Gifford, Surrey, Duncan, Ladner, and Milner. A full report of these fairs has already been compiled and sent in to the Secretary of the Department.

The supervision of the Pitt Meadows demonstration plot and the policy of this Division to place the potato-growing industry of British Columbia on a firmer footing by instituting the production of certified seed and by other means has been under the direct supervision of C. Tice.

REPORT BY C. TICE, SOIL AND CROP INSTRUCTOR.

DEMONSTRATION PLOT.

Under your instructions, Pitt Meadows demonstration plot, the only one now in operation, was again carried on. The work of past years has already proved that lime, manure, and underdrainage are essential if maximum production is to be obtained in the Pitt Meadows District. Owing to the late date at which the work was commenced on the demonstration plot this year it was impossible to give the land any fertilizer treatment in the season of 1920. For this reason it was decided to confine the work chiefly to crop and variety testing.

The following chart shows the way the 10 acres was cropped in the season of 1920:—

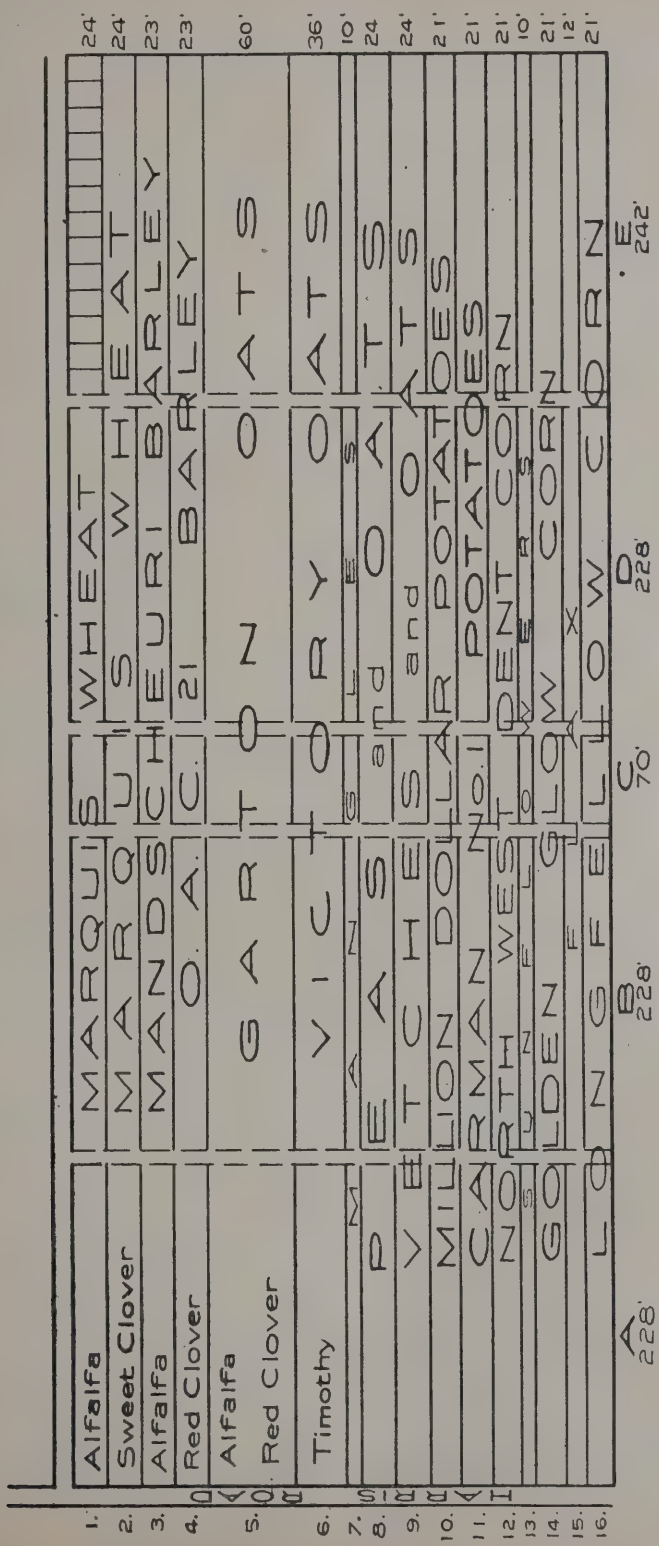


Table I. gives the results obtained from the large plots in 1920.

Table I.

Plot.	Crop.	A. Yield per Acre.		B. Yield per Acre.		C. Yield per Acre.		D. Yield per Acre.		E. Yield per Acre.	
		Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.	Tons.	Lb.
1	Marquis wheat (grain)* ..	..	....	..	....	..	....	..	....	..	....
2	Marquis wheat (grain)† ..	..	....	..	....	..	....	..	....	..	....
3	Mandscheuri barley (grain)‡	..	....	..	....	..	....	..	....	..	....
4	O.A.C. 2 barley (grain)§ ..	..	....	..	....	..	....	..	....	..	....
5	Garton oats (grain)	..	....	..	....	..	....	1	28	..	1,696
6	Victory oats (grain)	1	880	1	390	..	700	..	1,970	2	415
7	Mangels	..	....	..	....	..	....	..	....	..	....
8	Peas and oats for hay	2	1,760	2	1,980	3	1,060	3	80	3	480
9	Vetches and oats for hay ..	3	12	3	128	3	960	4	16	4	700
10	Million Dollar potatoes ...	4	134	3	166	3	620	4	260	3	960
11	Carmen No. 1 potatoes ...	4	1,360	4	260	4	1,240	5	980	4	1,140
12	North-west Dent corn	3	640	3	980	2	980	1	380	3	8
13	Sunflowers	7	800	8	320	7	1,460	4	1,360	6	360
14	Golden Glow corn	6	18	8	980	1	1,920	2	820	4	1,680
15	Flax	..	....	..	....	..	....	..	....	..	....
16	Longfellow corn	16	1,320	12	1,960	3	1,860	7	188	9	50

* Sections A, B, C, and D, 609 lb., or 1,400 lb. per acre.
† Sections A, B, C, D, and E, 365 lb., or 657 lb. per acre.
‡ Sections A, B, C, D, and E, 484 lb., or 871 lb. per acre.
§ Sections A, B, C, D, and E, 248 lb., or 446 lb. per acre.

The above results show that a variety of crops of value to the live-stock farmer can be grown satisfactorily at Pitt Meadows. The results are particularly encouraging in view of the fact that the land received no fertilizer treatment. The low results in Section C are due to the fact that this section has not received an application of manure or lime for the past four years.

No definite conclusions can be deducted from one year's course of experiments, but the results obtained with Plot 1, Marquis wheat, oats for grain, peas and oats for hay, and Longfellow corn are satisfactory, and everything points to the fact that these crops are especially adapted to the Pitt Meadows District.

The yields obtained with potatoes on Plots 10 and 11, although greatly below the average, serve to illustrate the value of carefuly selected seed. The Carmen No. 1 potatoes on Plot 11 were carefully hand-selected, whereas the Million Dollar potatoes on Plot 12 were nothing but the culls from table stock.

Sunflowers and alfalfa were tried out for the first time on the Pitt Meadows plot. Unfortunately, the results obtained were not satisfactory. Further tests will be made before definite conclusions are drawn.

Since peaty soils are deficient in potash and phosphoric acid, it was decided that an application of Dominion fertilizer might be beneficial to this kind of soil, this fertilizer being especially rich in phosphoric acid and potash.

Table II. gives the results of nine $^1/_{100}$-acre plots when various crops are treated with applications of Dominion fertilizer and Lignaite.

Table II.

Plot.	Crop.	Kind of Fertilizer.	Fertilizer Application per Acre.	Yield of Grain.	Yield of Straw.	Total Yield per Acre.
			Lb.	Lb.	Lb.	Tons.
4	Barley	Dominion	500	20	30	2.50
8	„	„	1,000	27	36	3.15
12	„	Lignaite	2,000	22	23	2.25
2	Oats	Dominion	500	30	56	4.30
6	„	„	1,000	28	57	4.20
10	„	Lignaite	2,000	21	39	2.90
3	Wheat	Dominion	500	19	44	3.15
7	„	„	1,000	15	35	2.50
11	„	Lignaite	2,000	15	48	3.15

Plots 1, 5, and 9 consisted of the same fertilizer tests, but corn as the crop experimented with. Unfortunately, the corn germinated very poorly and results were therefore a failure.

Potato-improvement Work.

Inspection.—During the middle of August an inspection was made, with the assistance of J. W. Eastham, Plant Pathologist, of some of the chief potato areas of the Dry Belt, the object being to obtain data regarding the extent to which disease was present in the growing crop this season and also to ascertain the purity of the seed being used.

This inspection included the Chase, Ducks, Kamloops, and Basque Districts. The following data is from fields representative of conditions in this area:—

Field No. 1.—Fifty acres; Chinese grower; variety not known. At least three foreign varieties present. Crop very free from serious disease, the only trouble noticed being about one-half of 1 per cent. of slight mosaic.

Field No. 2.—About 30 acres; Chinese grower; variety unknown. About 7 per cent. of admixture with foreign varieties of at least three different kinds: Mosaic, 1 per cent.: wilts, 3.5 per cent.

Field No. 3.—Chinese grower; about 35 acres. Foreign varieties, 4½ per cent.; wilts, 6 per cent.

Field No. 4.—About 25 acres; white grower; variety Ormanby. Apparently free from foreign varieties and practically free from disease.

Field No. 5.—About 25 acres; white grower; variety Netted Gem. Showed about 2 per cent. of admixture with foreign varieties, but practically no wilt or other serious diseases.

In the case of Fields 4 and 5 the crop was being grown with a view to seed production; in the other cases for ordinary purposes.

The contrast between the former and latter fields was very marked and showed the difference when good seed stock has been used at the start and care taken to keep it up to the original standard.

It is to supply seed of a reliable stock to start with that the system of inspection and certification has been developed in many of the States and Provinces.

Potato-spraying.

Experimental potato-spraying work was again carried on this year, but to not so large an extent as in previous years, the reason being that it has already been fairly well demonstrated that spraying is profitable in districts where late blight is present.

An experimental plot was established at L. Chevalley's, Sardis. Four rows were sprayed once, four rows twice, four rows three times, and four rows were left for check. Owing to the entire absence of late blight at L. Chevalley's the results obtained were negative this year.

New Work—Potato Certification.

Realizing the need for practically disease-free and pure seed of a standard variety, a plan for seed certification in this Province has been started by this Division. Certified seed-potatoes are potatoes which have been officially inspected both in the growing crop and after digging

for varietal mixture and diseases and found to conform to certain standards which have been adopted by the certifying agency. This is the most efficient method of producing practically disease-free potatoes in large quantities.

Although it will be impossible to certify any seed until next year, nevertheless rules, standards for seed certification, and certificates are now being prepared and articles written on the subject.

FIELD-CROP COMPETITIONS.

No field-crop competitions have been conducted by the Department of Agriculture for the past two years. However, several enthusiastic districts have continued potato-growing competitions. Two potato-growing competitions were held this year and judged by this official, the one at Errington and the other at Malakwa. The value of these potato-growing contests cannot be overestimated. It is one of the best methods for getting a district to standardize varieties and to learn potato-diseases. The farmers of both these districts went over the fields with the judge and were keenly interested in what he had to say. At both Errington and Malakwa evening meetings were held, which were well attended. It was very encouraging to the judge to note how the farmers of Malakwa were standardizing their varieties, only two varieties being entered in their competition—namely, Gold Coin and Netted Gem.

PUBLICATIONS.

A publication entitled "The Potato in British Columbia" has now been completed and is in the hands of the printer. To cover the subject of potato-growing thoroughly has been the constant aim of the writer. This bulletin gives much statistical information regarding the potato industry, besides information of a practical nature which should be of value to every potato-grower.

A circular entitled "British Columbia Potato-seed Certification and Inspection" outlines the standards that will be enforced by this Division in reference to the production of certified seed-potatoes.

Together with the above-mentioned publications, several articles have been written for the *Agricultural Journal.*

Appended are reports of soil and crop surveys. The purpose of these surveys was to become familiar with the local problems of the farmers in the districts visited.

W. NEWTON,
Chief Soil and Crop Instructor.
C. TICE,
Soil and Crop Instructor.

REPORT ON SOIL AND CROP SURVEYS.

W. T. NEWTON, B.S.A., M.S.

The frequent inquiries to the office of the Soil and Crop Division concerning Central British Columbia led this Division to undertake a soil and crop survey through part of this territory.

THE NECHAKO VALLEY.

The most prevalent type of soil in the Nechako Valley is of a heavy silty character. In many cases the subsoil, a densely packed silt, is very close to the surface. Owing to the dense condition of the subsoil and the shallow nature of the surface soil the humus content is not sufficient for maximum crop production. The successful management of these soils will consist of a method of cropping and handling that will increase the depth and humus content.

Deep Ploughing.—When many of these soils are deeply ploughed large blocks or clods of closely packed silt are brought to the surface. Experience has proven that such a practice is not so undesirable as one might suppose. The clods rapidly break down upon exposure to the air and weather. Such a practice is liable to leave the seed-bed rather cold and inert owing to the absence of vegetable matter in the silt subsoil brought to the surface. However, the intermediate course—that is, gradually deepening the soil by increasing the depth an inch or so each time the land is ploughed—is not possible owing to the difficulty of holding the plough

in a shallow layer of the subsoil. When farmyard manure is available to apply to the surface of the soil that has been deeply ploughed good results will undoubtedly follow. Deep ploughing on rich soils should only be practised in the fall, in order that the action of the frost and other weather conditions will have time to break down the blocks or clods of silt.

Deep tilling or subsoil ploughs could probably be used to advantage. If not available the common plough with the mould-board removed following in the furrow has the same effect. There are adjustments that can be made to attach to the ordinary plough to break up the subsoil. Any economical method that can be evolved that will break up the subsoil without bringing it to the surface is to be recommended.

Green Manure Crops.—To improve the texture of these soils it is necessary to incorporate vegetable matter. Owing to the scarcity of land under cultivation it is doubtful at the present time whether special green manure crops should be grown. Undoubtedly such a practice would be of value, but few settlers are in a position to lose a crop owing to the scarcity of winter feed. However, an intermediate course may be followed to advantage. In the case of clover-crops the first cutting should be harvested and the aftermath turned under. In regard to the choice of green manure crops the "legumes" are to be preferred. They are usually deep-rooted, increasing the depth of soil when ploughed up and the roots decay. They also increase the nitrogen content owing to the nitrogen-gathering properties associated with the bacteria that live on the roots. Common red or mammoth red would probably be a satisfactory green crop on the better-drained areas. These clovers are not grown to any great degree. Alsike appears to be more popular. Undoubtedly this crop is superior on areas that are poorly drained. The vetches have an important place. Peas, horse-beans, and possibly some of the lupines could be used to advantage as soil-improvers. Although many wild legumes, such as vetches, peavine, and lupines, are quite prevalent, an examination of several fields indicate that artificial inoculation is necessary before many of the cultivated legumes can be successfully grown.

Bare Summer Fallow is not recommended.—The practice of summer fallowing is followed to some extent. Although increased yields the following year will probably result, the increased yield will not compensate for the loss of a year's cropping. Furthermore, the greatest defect of these soils—namely, the lack of vegetable matter—is accentuated by such a practice. In the system of cropping followed the aim should be to increase rather than decrease the humus content. This can only be done by frequently including clovers or other legumes in the rotations followed.

Drainage should be considered.—Certain parties in the district do not favour fall ploughing. The reason is probably due to the lack of surface drainage. Owing to the flat character of considerable areas flooding is liable to result during the spring months when the snows are melting. The action of the winter frosts breaks down the soil and a good texture or mechanical condition should result, but if the soil is saturated with water the texture is destroyed. It is of absolute importance to plough the heavy silt soils in the fall, but the beneficial effects of fall ploughing will not be evident unless due precaution is taken that the surface is thoroughly drained. In many cases this cannot be accomplished unless the fields are ploughed in lands that are not too wide. Care should be taken that the furrows are clear and have an outlet before the ground becomes frozen in the fall.

Sandy Ridges.—The sandy upland ridges found in the districts should be the last to be brought under cultivation. These soils will suffer more from the lack of vegetable matter than the heavier types of soil.

Bottom Lands.—The best lands in the district are the bottom lands where it is possible to secure adequate drainage. As hay meadows they are ideal.

Use of Lime.—Both the silt soils and particularly the bottom lands require lime. The texture of the silt soils will probably be improved by the application of lime. The chief value of lime for this district lies in the fact that it encourages the growth of clovers and other legumes.

Forage-crops.—Timothy and awnless brome are the two cultivated grasses that are grown most extensively, timothy predominating. Excellent yields of timothy are secured on the bottom lands, but it is probable that on most of the soil types there are other grasses that would excel either timothy or awnless brome. Tall oat, orchard-grass, and meadow-fescue should be included in the mixture for the silt soil. The clovers, common red, mammoth, and alsike, should also be included.

The value of using clovers in the mixture is well illustrated on the farm of Sam Milne. Part of a field was in timothy and part included clover in the mixture. The field was ploughed last fall and sown to oats this spring. There will be at least a 25-per-cent. increase in the oat yield where the clover-sod was turned under, compared with that portion of the field where the timothy-sod was turned under.

Sweet clover has been tested, but it has not done too well. Possibly better results would have been secured if the seed were inoculated. In areas that are well drained sweet clover may assist in obtaining a stand of alfalfa owing to its relationship to the latter plant.

Alfalfa.—There is evidence that the hardier strains of alfalfa may be grown. Only hardy varieties, such as Grimm, Cossack, and Ontario Variegated, should be tested. If the soil is limed and is naturally fairly well drained and free from wild grasses the crop will likely prove successful. The duration of the crop, however, is liable to be short owing to the heavy nature of the subsoil.

Sunflower.—The Russian sunflower has been tested by several farmers. It appears to have considerable promise as an ensilage crop for the Nechako Valley. On the farm of S. C. Borhaven is an excellent demonstration plot.

Peas and Oats.—Peas and oats would probably prove to be an excellent combination for spring planting. Inoculation material should be used with the seed-peas. A field of peas grown by S. C. Borhaven was examined for nodules. The absence of nodules suggests the advisability of using inoculation material.

Fall Wheat and Hairy Vetch.—Fall wheat and hairy vetch is the fall-sown combination that is worth testing (1½ bushels wheat and 30 lb. hairy vetch) for silage purposes. Fall rye may be used when early summer feed is required. On the areas that are liable to flood fall-sown crops should not be attempted. On account of the protective covering of snow, winter-killing is usually due to smothering by flooding rather than to low temperatures.

The Silo.—Two parties will probably erect silos this year. Their value in the district will soon become self-evident. The long winter-feeding period requires some form of succulent feed. Ensilage is the cheapest feed of this character.

Roots.—Roots, particularly swedes, do well on the deeper soils of the district. The crop at the present time is almost free from disease and insect pests.

PRINCE GEORGE.

The soil south of Prince George and west of the Fraser River is a silt very similar to the type prevailing in the Vanderhoof District; consequently the same management rules hold. It is a fine silt that is lacking in colloidal material; consequently the texture is not ideal. Remedial measures consist of increasing the humus content. Deep working of this type of soil will ultimately pay. Many sections are sandy to gravelly in character. These sandy-to-gravelly types are not very productive, and consequently should not be cleared until the better types are brought under the plough. South and east of the Fraser the soil is somewhat similar. Good catches of clover have been secured. Common red and mammoth have done better than alsike. The experience of a number of settlers suggests that deep-tilling implements will pay. North of Prince George is an area of deep brown loam. This soil is the best vegetable, small-fruit, and potato soil in the district. (The statement only applies to the territory surveyed by the writer.) However, the area of this soil is limited and the character of the country very hilly. The best stand of red clover seen in the district was on this type of soil on the farm of J. D. Newland.

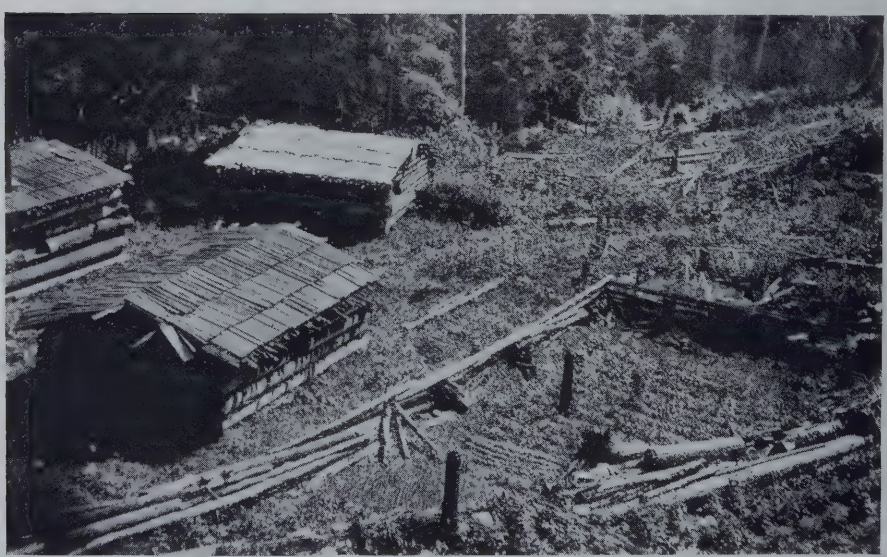
About 15 miles north-west of Prince George there are large areas of excellent land. The district is known as the Salmon River Valley. The soil contains more colloidal material than those south and west of Prince George; consequently, under proper management, are liable to be very productive. Fall ploughing and surface drainage are important factors to be considered in their management. Continuous cropping of timothy as practised through this district will rapidly destroy the yielding capacity of these soils. The clovers have to be included if the texture of the soil is to be maintained and improved.

Considering the district as a whole, the red clovers have not been popular. This is probably due to the fact that most of the hay grown in the district has been sold. Alsike mixes better with timothy, making a more saleable quality of hay. With the advent of live stock the red clovers are liable to become more popular. When weather conditions are unfavourable for the curing of red clover the crop may be saved to advantage by placing it in silos.

Sunflower-crop grown for dairy-feed at Canyon City, near Creston.

North Barriere Lake, North Thompson Valley.

A prospector's cabin near North Barriere Lake.



A future home. A pre-emption at North Barriere Lake.

Field-crop Experiments in the Prince George District.—Various crops have been tested from time to time in the Prince George District by farmers that are interested in the agricultural progress of the district. The productiveness of the heavy silt soil, a type that is very prevalent in the district, has been definitely established by the experiments conducted on the farm of M. Henderson. The past season was very backward; consequently the yields this year cannot be considered as representative. Fall ploughing has not given the results that should be expected, probably due to flooding. The system of ploughing so that fields are left in 30- or 40-foot lands would probably give good results in the case of fall ploughing, providing the necessary precaution is taken to prevent water lying in the furrows. On such soils fall ploughing, unless the soil is adequately drained, will seldom prove advisable. On the heavier types of soil found in this district, if the seeding weather is unfavourable, the soil after being seeded is frequently quite lumpy. When such a condition exists the practice of rolling the land after the grain is about 3 inches high is to be recommended.

Harrowing with a light harrow after the grain is up would be beneficial. The results this past year suggest that spring rye is not a very profitable crop on the heavy silt soils. Fall rye, if it does not winter-kill, will outyield the spring in this district, and unless the land is poorly drained should come through the winter successfully. Although fair crops of flax have been produced on the experimental plots, the writer is of the opinion that until the humus or vegetable-matter content is increased by turning under sod, green manure crops, or barnyard manure flax is not to be recommended.

The physical qualities of these soils must be improved if maximum crops are to be obtained. Until the humus or vegetable-matter content of the heavier types of soil found in the Prince George District is increased crops like flax, that do not improve the texture of soils, should be avoided.

The Mensury barley appeared slightly superior to White Hull-less on the experimental plot.

The district as a whole gave great promise as a live-stock district. The soils are rather more variable in character than are found in the Nechako Valley. Large areas of soils are exceedingly productive. With the introduction of live stock and a more extensive use of red, mammoth, and alsike clover, the soils can be greatly improved. The absence of humus or vegetable matter is the greatest soil defect when considering the district as a whole.

QUESNEL DISTRICT.

Land in crop, except hay, 2,200 acres; land in crop, grasses, 1,900 acres; land cleared ready for cultivation, 400 acres; land used for cultivation, 20,000 acres; total, 24,500 acres.

Estimated yield, 1920 figures, compiled by S.C.R. Representative: Wheat, 7,766 bushels; oats, 99,382 bushels; barley, 1,250 bushels; hay, timothy, and clover, 3,196 tons; alfalfa, 800 tons; potatoes, 939 tons; market-garden produce, 600 tons.

Climatic Conditions.—Frosts at night up to June 1st.

DRAGON LAKE DISTRICT.

Time only permitted a survey of the Dragon Lake District. Many of the hay meadows were damaged this past year owing to the high water in the lake. On the whole, however, both the hay and the grain crops in this district were good. In the region south of the lake alfalfa would probably be very successful on account of the lime content of the soil. The area under this crop could be profitably increased. Sunflower has been tested in the district and gives promise of being a crop well suited to the district. The introduction of a greater number of silos in the district will tend to place the live-stock industry on a firmer footing.

Many of the soil types, of which there are a wide range, are suitable for the production of a high-grade baking-potato. The best-quality potatoes are produced on the upland soils when sufficient moisture is available.

SURVEY OF EAST KOOTENAY, BOUNDARY, AND SIMILKAMEEN DISTRICTS.

East Kootenay.—That live stock is the mainstay of agriculture in the East Kootenay is an accepted fact. Summer range conditions are excellent and for the most part can carry satisfactorily a considerably greater amount of stock than is found at the present time. However, in order to take full advantage of the range it is necessary to increase the amount of winter feed. Last year many farmers in the district around Golden were buying hay. The practice

of purchasing hay to tide over live stock is seldom profitable unless there is an exceptionally good local market for the sale of dairy or other live-stock products. A certain quantity of concentrates may be purchased and used to advantage, but the roughage should be produced on the spot.

A Better Selection of Forage-crops must be made and More Land cleared.—To maintain the productiveness of the soils of the East Kootenay special attention must be paid to the selection of legumes. Around Golden the red clover appeared to be more promising than alfalfa. Both crops, however, have their place, in that they supply the soil with much-needed nitrogen and their deep-rooted habits prevent the depletion of the surface fertility. The farmers that are growing both crops should carefully estimate their relative merits. A good rule to follow is to use alfalfa on the hillsides and well-drained benches and use red clover on the bottom lands, where the water-table is liable to be nearer the surface at certain times of the year. Some of the bottoms are too poorly drained even for red clover. On these alsike should be tested; on all recently cleared lands inoculation material should be used with the alfalfa and clover seed.

Alfalfa as a Drought-resistant Crop.—The question was frequently asked as to whether alfalfa could be grown without water. It is extremely doubtful whether a satisfactory stand can be obtained without irrigation. When once well established the deep-root system enables the crop to stand quite long periods of drought, but during the early stages of its growth a drought is liable to cause considerable damage.

Silos and Forage-crops.—The popularity of the silo is increasing. Some form of succulent feed is necessary if stock are to be wintered satisfactorily. The economy of ensilage has long been definitely established.

The Russian sunflower is giving much promise. Peas and oats are an excellent spring-sown combination. Fall rye and hairy vetch would probably be satisfactory as a fall-sown mixture.

Winter-killing.—Last winter proved to be exceptionally severe. Many clover and alfalfa meadows were badly winter-killed. Examination of several of the meadows where winter-killing occurred was an excellent object-lesson, illustrating the importance of good drainage as a preventive. Winter-killing seldom occurred where the land was well drained. On those areas where water tended to accumulate frequently the clovers and alfalfa were completely killed. When the soil freezes, if the soil-spaces are completely filled with water, the pressure due to the increase in volume of the water when it freezes is sufficient to destroy the roots of the clover and alfalfa. Also, a layer of ice over a field or section of a field may cause winter-killing by smothering.

Fall Irrigation.—Fall irrigation is frequently advisable owing to two main factors: First, to the pressure of other work in the spring; and, secondly, to the check cold irrigation-water gives to the crop when used early in the spring. It is necessary, if maximum crops are to be obtained, that growth commence as early as possible. Most of the irrigation-water is so cold that germination will be delayed some time if used shortly after seeding, and during the early stages of growth most crops are very apt to be given a severe check by using cold irrigation-water. However, fall irrigation has its dangers. If meadow land is irrigated shortly before a heavy frost the saturated condition of the soil will tend to cause winter-killing. On poorly drained soils this danger is greater. Frequently an open ditch, tile or cedar drain will prevent a great deal of winter-killing. On hillsides a ditch at the upper end of the field often cuts off the seepage from higher levels, thereby remedying the trouble.

Well-drained Soils are More Retentive of Moisture.—It should not be considered that because irrigation is necessary drainage is unnecessary. Soils naturally or artificially well drained, other factors being equal, are more retentive of moisture than poorly drained soils. At the same time there will be left in the soil sufficient air-space to prevent serious damage by heaving when the soil freezes.

Control of Alkali.—Like most ailments, the prevention is easier and less costly than the cure. Many fields examined showed slight traces of alkali. In a number of cases careful soil-management will prevent the trouble from becoming serious. But the careless use of water with no attempt to check unnecessary evaporation is liable to cause large areas to become unfit for crop production. Alkali is usually found in concentrations that injure plant-growth in the surface few inches of soil. All soil-water contains quantities of salts in solution. When evaporation occurs those salts are left on or near the surface. Any method that will reduce the concentration of these salts will prevent the development of alkali areas. The only effective method to check

evaporation is by means of the soil-mulch. As soon as possible after irrigation the harrows should start operations. A layer of dry soil 2 or 3 inches in depth is required.

When water is plentiful there is a tendency to use an oversupply. This is particularly dangerous if the soils are not well drained. If the water can escape by leaching through the soil it will carry the alkali down with it, thereby improving the trouble. If the surplus water has to disappear by evaporation the alkali will be brought to the surface. Drainage is an important consideration in the control of alkali, particularly on the bottom lands.

Deep Tillage as a Remedial Measure.—Owing to the fact that alkali is usually found at or quite close to the surface, deep ploughing and tillage will frequently lessen the concentration by distributing the salts, lowering the concentration below the point where it is harmful to plant-growth. Heavy irrigation where good drainage can be secured has a similar beneficial effect.

The Use of Alkali-resistant Crops.—Among the valuable farm crops alfalfa and sugar-beets are quite resistant to alkali.

Character of the Irrigation-water.—What appeared to be alkali on one farm was traced as probably due to an irrigation-ditch that drained a hot spring containing a heavy concentration of alkali in its water. Cases of this kind, although perhaps somewhat rare, should be guarded against by cutting off any water from the irrigation-ditch of doubtful composition.

Alfalfa-seed Production.—East of the Windermere Lake the setting of seed on the second cutting of alfalfa was heavier than the writer has seen in any other place in the Province during this present year. At the present price of alfalfa growers should look carefully into this fact, for if the alfalfa promises to bear proportionately heavy at any future date there is no doubt as to whether harvesting the alfalfa for seed would be profitable. It would be unwise to purchase expensive machinery for threshing and handling the seed until the approximate yield of seed is estimated. By placing all the teeth available in the cylinder and cylinder-head of the ordinary grain-separator and checking the rate in which the material goes through the separator by attaching sacks across the rear of the cylinder, the alfalfa can be threshed fairly satisfactory. It is preferable to delay threshing until cold frosty weather on account of the difficulty of freeing the seed from the pods when the ordinary grain-separator is used.

Lack of Humus in the Soils of St. Mary Prairie.—Attention is drawn to the fact that the decrease in yields of grain where it is raised without water on St. Mary Prairie and elsewhere is frequently due to lack of humus. The water-holding capacity of soils rich in humus enables them to carry over a crop in spite of a long dry season. Unless water can be secured it will be necessary to plough under green manure crops. A fall-sown mixture is probably preferable. Fall rye and hairy vetch would likely prove satisfactory. The advantage of a fall-sown mixture is that, first, water is economized by the early spring growth when moisture is usually plentiful; secondly, it can be ploughed under early in the summer, giving the farmer time to obtain a firm seed-bed by fallowing for either fall or spring planting.

Soil-management Principles Applicable to These Soils.—The economy of moisture is of first consideration. The use of fall wheat instead of spring wheat should be considered owing to the more rapid growth fall wheat makes in the spring, when plenty of moisture is available. A firm seed-bed is absolutely necessary in order that the moisture be brought in contact with the seeds to promote rapid and even germination. After the grain is up 2 to 4 inches it is advisable to harrow. The rigid-tooth harrow should not be used, but when an adjustable-tooth harrow is available the practice is decidedly advantageous. It forms a mulch between the plants, preventing the loss of water by evaporation.

In the Baynes Lake District special attention must be paid towards increasing the humus content of the soil owing to the scarcity of irrigation-water. The bottom lands in this district and at other points in the East Kootenay District could be greatly improved by ploughing and reseeding. A mixture of timothy, orchard-grass, tall oat, alsike, and red clover would probably be satisfactory. Frequently, if drainage conditions can be improved by open ditches, tile or wooden drains, the quality of the meadow forage can be greatly improved by ploughing and reseeding.

The problems in relation to soil-management in the Boundary country are very similar to the East Kootenay. The humus content of the soils must be increased where crops are grown without irrigation. Farmyard manure should be used whenever available. The sooner it is removed from the barnyard to the field the smaller the loss of plant-food material. When the

manure contains much straw it cannot always be applied satisfactorily owing to the fact that it may open up the soil to such an extent that it will dry out badly. When this is the case the manure should be piled in a compact pile in a position where the liquid parts are not allowed to run away. Approximately half the value of stable manure is contained in the liquid parts, and consequently every precaution should be taken to prevent the loss of the liquid parts. The more compact the pile, other things being equal, the smaller the loss of plant-food nutrients. Frequently a manure-shed can be so constructed to act as a shelter for stock. The cattle tramping over the manure keeps the manure compact.

Maintenance of Fertility in the Orchards of Keremeos.—Some of the older orchards in the district are beginning to decrease in productiveness. Special attention must be paid in the near future towards maintaining the supply of plant-food. Where alfalfa or clover are grown as cover-crops the nitrogen content may be maintained without artificial fertilization. If the crop is removed and fed to live stock the manure must be returned or the yields of fruit will soon deteriorate. Nitrogen is an important plant-food. If an artificial nitrogen fertilizer is used it should be applied early in the spring. When the fruit is inclined to be off-colour superphosphate should be applied. On the lighter soils a fertilizer containing potash will improve the quality of the fruit. The humus content of the soils must be maintained either by using legume cover-crops or with stable manure.

The soils that are cropped without irrigation around Princeton are for the most part very fertile. To maintain their productiveness the humus content of the soil must be kept up.

In the districts surveyed live stock have an important place. There is no artificial manure that can take the place of stable manure. It contains not only the necessary plant-food ingredients and humus, but it also contains organisms that increase the availability of the plant-food ingredients already present in the soil.

METCHOSIN DISTRICT.

A preliminary survey of the Metchosin District, V.I., suggests that soil-acidity is an outstanding defect. Tests were made at numerous points in the district, and for the most part only where lime had been previously applied were there indications that lime was not required to correct acidity. The low nitrogen content of many of the soils could be improved by a more careful selection of legume-crops. The clovers, peas, beans, and vetches all appear to be admirably suited to the district. The inclusion in a short rotation of one or more of these crops would assist materially in maintaining the fertility of the Metchosin soils. More attention must be paid to the maintenance of an adequate humus-supply, particularly on the light upland types of soil. Owing to the dry midsummer period these soils, no matter how fertile, will be unproductive unless sufficient vegetable matter is added to make them more retentive of soil-moisture.

Fall-sown crops on the types of soil that are well drained will probably outyield spring-sown crops. This is due to the earlier start fall-sown crops make in the spring. Being better established, fall-sown crops suffer less from the dry summer weather. For silage purposes a mixture of Sun wheat and spring vetch, fall-sown, is well adapted. Smaller quantities of peas and oats added to the mixture will usually increase the total yield. Mixtures will usually live through the winter much better than crops sown singly.

REPORT OF DISTRICT AGRICULTURIST, KAMLOOPS.

GEO. C. HAY, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to report as follows for the year 1920:—

CANADIAN CO-OPERATIVE WOOL-GROWERS, LIMITED.

The Canadian Co-operative Wool-growers, Limited, has done a record business in wool during the past season, handling in the neighbourhood of 5,000,000 lb. This has been collected by the different Provincial associations and forwarded to the central organization for storage or to be disposed of to the best advantage. Already approximately 2,500,000 lb. have been sold at prices ranging from 17½ to 60 cents per pound, and there is hope of having the bulk of the

unsold wool disposed of before the annual meeting in February. However, the way the wool market is at the present time it is difficult to predict how prices will be.

Many factors contribute to the dull, inactive state of the market, chief among them being stocks of wool on hand. It is estimated that fully a year's supply has accumulated ahead of normal requirements. The British Government still has 1,000,000,000 lb. left over from their war control of colonial wools. In the United States fully 80 per cent. of this season's clip is reported being held by growers in co-operative pools or on consignment to their account, and six months' production is still left in Australia, Argentina, Uruguay, and South Africa. All this wool is naturally pressing for sale. At a recent United States Government auction held in Boston the highest price realized for any greasy lots was 17½ cents, while scoured wools sold at 15½ to 22 cents, with one lot at 26 cents. It must be kept in mind, though, that such prices are not representative of present-day values, and if obtained by any concern other than the United States Government bankruptcy would result.

The above does not sound any too encouraging, but it is readily understood that such a crisis was bound to come and it can be noted to-day in every other line. At the same time there are a few outstanding facts which should be held in mind—namely, that through this growers' organization they have been financed this season to a greater extent than that provided by any of the older wool-houses with considerably more capital. Again, while many other channels through which wool is ordinarily marketed were closed this year on account of market conditions, this organization accepted freely all growers' wool, making cash advances thereon. In Western Canada these advances were as high or higher than prices paid outright in the various local fields. In other words, through the Canadian Co-operative Wool-growers, Limited, the growers have been able to readily make shipments of this wool and to receive for domestic 15 cents and range 20 cents per pound f.o.b. their farms. Furthermore, there is the possibility of receiving a still further sum should the market warrant it on the final disposal of the wool. Truly co-operative marketing has proven its real worth to the wool-grower in such a season as the present.

Your Agriculturist has represented this Province as director of the Canadian Co-operative Wool-growers, Limited, during the past year and considerable of his time was occupied in endeavouring to strengthen the organization.

British Columbia Wool-growers' Association.

The British Columbia Wool-growers' Association has been active during the past year in collecting wool in this Province, and as a director of this association your Agriculturist has tried at all times to advance the interests of sheepmen, and particularly by marketing their wool through the Wool-growers' Association.

British Columbia wool was collected at Kamloops from all parts of the Province and car-loads made up and forwarded to the central warehouse of the Canadian Co-operative Wool-growers, Limited, at Toronto, and this organization on receipt of same graded and offered the wool for sale. Some 174,060 lb. of wool was shipped from this Province, which is a very substantial increase over that of last year, when 96,769 lb. were handled.

It is also encouraging to note shipments have been received this season from all parts of the Province were sheep are being raised. Approximately 17,000 lb. were received from sheepmen on Vancouver Island, about 12,000 lb. from the Kootenays, and several thousand pounds from growers along the Grand Trunk Pacific. These figures go to show the association has now extended its usefulness into all parts of the Province.

Bull-sale.

As Secretary of the 1920 Kamloops Bull-sale your Agriculturist has had considerable to do in this connection throughout the year; 135 head of animals were entered in the sale, and of these 105 were sold for $20,922. The sale was very successful in every way and after paying all expenses showed a balance in the bank of $102.33.

Formation of British Columbia Shorthorn and Hereford Breed Associations.

On the evening of July 1st a number of stockmen met in the City Hall, Kamloops, to discuss the advisability of forming Provincial Breed Associations for the Shorthorn and Hereford breeds. H. D. Smith, Secretary of the Dominion Hereford-breeders' Association, was present and outlined the objects of such associations. After considerable discussion it was agreed such associations

in this Province might help materially in cleaning up matters at fault in connection with registration papers, etc. Accordingly, the respective associations were formed and your Agriculturist agreed to act as temporary Secretary, and since has made an effort to straighten out pedigrees for certain members as well as an effort to increase the membership.

INSTITUTE MEETINGS.

During the past year various institute meetings were arranged and on different occasions addresses were given on agricultural topics. Several wool-growers' meetings were held at different points in the Province in connection with the marketing of wool.

FALL FAIRS.

The fairs visited during the past year were Kamloops, Vancouver, New Westminster, Victoria, Duncan, Mission, Aldergrove, and Gibson Landing. In connection with the Kamloops Fair, as a director your Agriculturist assisted not only during fair week, but also at meetings, etc., throughout the season. At the various fairs visited your Agriculturist judged sheep, sheep and swine, or farm produce.

QUILCHENA DRY-FARMING STATION.

The Quilchena Farm has been manager during the past year by Clarence Phelps, who has been working under adverse circumstances to make a success of the place. Spring opened fairly early and about 80 acres of crop was seeded in good shape. There was an abundance of moisture in the soil at seeding-time, and a good harvest was anticipated. Practically all the seed sown was pure as to varieties and a number of variety tests were set out, from which it was hoped to get some valuable information. Unfortunately, during midsummer, when the grain was heading out nicely, the entire crop was attacked by grasshoppers, and so serious was the attack that nothing was left to be done but to cut all for hay and by so doing secure as much feed for the stock as possible. This plague was particularly disheartening and accounts for the rendering of this very unsuccessful 1920 crop report.

During the summer 15 acres were summer-fallowed and 30 acres of new land broken up. A horse and cattle corral 90 feet square was built in the yard; also a 1-acre paddock was fenced securely for rams, hogs, etc. Sixty-two feet of feed-racks and trough was built for the sheep; about 50 tons of grain-hay was stacked for winter feed.

Three fertilizer experiments were set out on grain, hay, and root crops, but owing to the grasshopper-infestation it was impossible to estimate the results of this experiment. The grass hoppers also prevented the getting of good information on a test of the following sixteen different varieties of grasses which were tried out: White sweet clover, alfalfa (Rennie's), red clover, white clover (Rennie's), alsike clover, western rye-grass, Italian rye-grass, perennial rye-grass, timothy, tall oat-grass, orchard-grass (V.M. Co.), red-top grass, tall fescue, meadow-fescue, Kentucky blue-grass, and awnless brome.

All grasses consisted of ¾-oz. samples and were sown in plots under as nearly equal conditions as possible on May 13th, and all showed up through the ground on June 1st, excepting awnless brome, which appeared a few days later. Generally speaking, all varieties did fairly well during the early summer, but later the dry weather and grasshoppers very seriously retarded growth and Kentucky blue and tall fescue completely died out. Tall oat-grass and western rye have gone into the winter looking the most promising, while awnless brome and alfalfa also looked very good. The remaining varieties did not look hopeful.

SHEEP.

The sheep at the Quilchena Farm have done very well during the past season; 110 ewes came through the winter, and of these fifty-one were lambs of the previous year. From this flock were raised 115 lambs, which are all on the farm at the present time. The sheep market being so low this fall, it was considered advisable to hold the wether lambs until the beginning of the new year in the hopes of a rise in price.

HORSES AND CATTLE.

One spring foal was raised this season, an old mare sold, and one horse 6 years old traded this fall for two cows and two calves. There are now seven horses on the place and eleven head of cattle.

Office.

The above lines of work, together with the supervision of the Dry-farming Station at Quilchena and frequent inquiries for information at the office in Kamloops, has kept your Agriculturist especially busy during the past year. An effort has been made at all times to assist the local farmers in finding the best markets for their produce and stock. These various lines of work conducted by the Department of Agriculture in this district are appreciated by the local farmers and others interested, as noticed by the steady increase of correspondence as well as the increase in number of visitors. The efforts of the Department to develop the agricultural interests of the district are at all times greatly appreciated by all concerned.

Respectfully submitted.

Geo. C. Hay,
District Agriculturist.

REPORT OF CHIEF POULTRY INSTRUCTOR, VICTORIA.

J. R. Terry.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith report for the year 1920.

General Conditions.

During the past year an increase in the number of poultry-keepers has to be again reported. There were not so many beginners this year, however, as was the case in 1919. There were fewer returned soldiers taking up the work this year. The demand for day-old chicks was again very large. With the general slackening-up of the comparatively prosperous conditions a number of poultry-breeders were forced to close down operations. In most instances this was brought about owing to lack of capital and experience.

Owing to the big demand for day-old chicks most of the breeders catering to this work were unable to supply the demand; as a result some breeders were forced to import chicks from the State of Washington. The magnitude of these importations can be gauged by the fact that one hatchery alone situated near Seattle sold over 50,000 day-old chicks in the Province last year. The hatchery just mentioned is opening a branch hatchery in Vancouver with an incubator capacity of 24,000 eggs for a start. This hatchery claims that at present they cannot get sufficient eggs in the Province to keep the machines running, so for the first year at least are going to import eggs from Washington breeders.

The increase of chicks hatched during the year will average about 18 per cent. higher than the 1919 total. A considerable number of chicks were shipped out to the Prairie Provinces and good results were reported on chicks sent as far east as Winnipeg. The price of chicks averaged around 30 cents apiece for light-weight varieties and 35 cents apiece for heavy-weight varieties. Breeding stock and hatching eggs were exported to the Orient, the adjacent States, such as Washington, Oregon, and also to Eastern Provinces of the Dominion.

For the first time possibly in the history of the industry large shipments of eggs out of the Province have been made during last fall and are being continued at the present time. A trial shipment was sent to Montreal and owing to the high quality in grading orders were received for car-load lots of British Columbia fresh eggs. Unfortunately, however, these were unobtainable, but all available eggs are being forwarded. The large cities in the Prairie Provinces, such as Calgary, Edmonton, etc., are also receiving express shipments of eggs daily for the high-class egg trade. Whether these shipments will be continued in the future remains to be seen, but the fact that the other Provinces of the Dominion are 4,000,000 laying hens short of the previous year has doubtless had something to do with the exportation.

Very satisfactory prices have been received for the eggs. These shipments have helped to keep up local prices in the Province, although there has been quite a decreased demand for eggs owing to the slackening-up of work in the mining districts and lumbering industries.

In past years the majority of the imported eggs into the Province have arrived from the Eastern Provinces; the past year, however, has seen a big decrease from Canadian sources and

a slight increase from foreign sources. The Dominion Customs official reports show that in 1919 the importation of eggs from other Provinces into British Columbia were 1,041,202 dozen. Last year this had dropped to 512,340 dozen, a decrease of over 500,000 dozen. Foreign importations of eggs during 1919 reached a total of 939,988 dozen. Last year this was increased to 1,073,567 dozen, being an increase of 130,000 dozen in round numbers. In other words, there were nearly 400,000 dozen less eggs imported into the Province during the past year than during 1919. The increase in the number of fowls kept probably has something to do with the decreased importation.

WEATHER CONDITIONS.

The spring weather conditions approximated those of the previous year, and as a result the usual poor hatching complaints were to be heard. Whilst the cool weather helped egg production rather than hindered it, the mortality amongst young chicks more than balanced the favourable year secured. It is sufficient to state that a very large percentage of the chicks which died could have been saved if more heat had been supplied them in the brooders. Coccidiosis and gapes were prevalent during the month of May especially, and a heavy mortality rate was reported from these two diseases.

PRICE OF FEEDS.

Until a month or two after the harvest had been secured feed prices kept up to the high level of the previous year. After the period mentioned a welcome change is to be recorded. Most of the grains have dropped considerably, although concentrates are still at the previous high level. It is hard to understand why beef-scrap and allied meals have not dropped in value long ere this. The total showing the gradual rise of prices since 1912 is given attached, as it may be of interest to those who desire to watch the present downward trend of prices so as to compare them with past years.

DIVISION OF WORK.

The whole of the inspection and instruction work of the Province has been in the hands of the writer since Mr. Upton, the District Poultry Instructor stationed at New Westminster, left the Department last March. As a result of this extra work no visits have been paid to the Interior of the Province. It is over two years now since the writer has been in the Interior; it is to be hoped that the two District Inspectors will be secured at an early date. The inability of the Department to secure suitable clerical assistance has kept the writer more or less tied to the office, whereas if a clerk could have been secured more field-work could have been taken up.

LECTURES AND DEMONSTRATIONS.

To the members of the Farmers' and Women's Institutes, Poultry Associations, and allied societies, lectures and demonstrations have been given as in past years.

PROVINCIAL POULTRY ASSOCIATION.

The usual Provincial Poultry-show was again held in Vancouver and the number of entries exceeded the previous year, when over 3,000 exhibits were staged. The very large display of incubators and poultry appliances was a surprise to visitors to the show. The fact that most of the incubators shown were manufactured in the Province serves to show that the industry is more than ever becoming firmly established. The local associations affiliated with the Provincial Association increased their number by three new associations during the year, bringing the total up to thirty. The new associations formed are located at Prince George, South Vancouver, and Salmon Arm. Ten district group shows were held throughout the Province during the late fall and early winter. At each and every show very large entries were made in the utility live poultry classes, as also in the classes liberally supplied for dressed poultry and eggs.

The Breeders' Directory was again published and was eagerly sought after by those desiring to purchase reliable stock and eggs. An edition of 3,000 copies was distributed during the year. The association in the form of premiums distributed to its members egg-record journal books and sample packages of permanganate of potash. Members of the association again did well in the different egg-laying contests held both in Canada and on the American side.

The association has again co-operated with the British Columbia Poultrymen's Union. The latter organization is now changing its name to the Co-operative Poultrymen's Exchange. This organization has been exporting large quantities of British Columbia fresh eggs to Eastern Canada and the organization is certainly to be congratulated upon its enterprise. At the last convention of the Provincial Poultry Association the writer was, according to constitution, again appointed Secretary-Treasurer.

Egg-laying Contest.

The Ninth Egg-laying Contest concluded on October 5th, 1920, after having run the full twelve months. The classes were as follows: Class 1, 21 pens; Class 2, 19 pens. The birds entered in the contest were trap-nested, this being the first time trap-nests had been used. In Class 1, out of 126 birds competing, 9 birds laid over 200 eggs apiece during the twelve months. The best laying bird in Class 1 laid 243 eggs and the poorest layer laid 22. In Class 2, which comprised all heavy-weight varieties and numbered 114 birds, 11 birds exceeded 200 eggs, the highest bird laying 228 eggs and the lowest bird 18. As happened during the Eighth Contest, some of the best laying-pens were again disqualified during this contest for laying eggs less than 24 oz. to the dozen, average weight. Six pens in Class 1 and six in Class 2 were disqualified.

In connection with our Egg-laying Contest, the Dominion Government allowed all the birds entering to enter the Dominion Record of Performance. To qualify for registration in the Record of Performance in the A Class each bird had to lay 150 eggs and to qualify in the A-A Class they had to lay 225 eggs. In starting up this work the Dominion Department of Agriculture is blazing a new trail, as so far as is known no other country in the world has as yet started this work. It is interesting to note that last year the bigger proportion of birds entering the Record of Performance work, whilst being kept on their owner's farms, came from this Province.

The Provincial Poultry Association again provided cash prizes, diplomas, and bronze medals to winners in each class each month.

Boys' and Girls' Poultry Club Competitions.

The competitions this year were not quite so numerous as last, there being only thirteen clubs entered. The competition, however, was very strong and the quality in most cases exceedingly high. The up-country competitions were again handled by judges sent out by the Department to fall fairs.

"Eggs Marks Act."

As one of the Inspectors under the Act, the writer made the usual visits to the wholesalers and cold-storage plants in the districts under his supervision. Regular visits were made to the city markets and frequent warnings given retailers concerning non-compliance with the Act. Many complaints were made during the year regarding the alleged non-enforcement of the Act. The writer desires to point out that until the co-operation of the municipal and Provincial Police can be secured the requirements of the Act will be very hard to enforce.

Promises made by Dominion Poultry Division officials two years ago that new regulations would be passed dealing with imported eggs have not been carried out, and as a result the new "Eggs Marks Act" is still in abeyance. The writer, however, is of the opinion that the adequate enforcement of the original Act would meet the needs of the circumstances. A rather peculiar situation has arisen owing to the enforcement of the "Eggs Marks Act" against Chinese eggs being sold in the Province unless each individual egg be stamped. Whole train-loads of Chinese eggs have been landed in the Province and transported in bond through to New York and other Eastern States; similar quantities of eggs have been landed direct in Seattle and sold there. This invasion forced down the price of eggs in the State of Washington to such an extent that the American producers shipped over large quantities of fresh eggs into the Vancouver market. The writer is of the opinion that if there had been the usual importation of Eastern Canadian eggs into the Province the American eggs would not have been brought in. It is computed that there were 4,000,000 less hens in Canada last year. This would account for the drop in importations from the other Provinces.

In an effort to deal with the flooding of the Washington State market with Oriental eggs the poultrymen there are asking their Federal Government to place a duty of 12 cents per dozen on such eggs. The writer is of the opinion that it will be almost impossible to get this duty imposed. The big interests in the Eastern States will demand Oriental eggs so long as the local supply cannot meet the demand. By far the larger portion of the Chinese eggs reach the Eastern markets.

POULTRY-DISEASES.

Owing to the cold, wet spring serious outbreaks of coccidiosis were reported and investigated. A large proportion of day-old chicks sold in the Province died from the ravages of this disease. Sooner or later the writer is of the opinion that there must be adequate supervision and inspection of day-old chicks from outside the Province if these outbreaks are to be checked. Oftentimes the hatcheries of the near-by States have received less than half the purchase price for their chicks than secured by local breeders. To sell so cheaply, inferior breeding stock surely must be used.

FALL FAIRS.

The fall fairs applying for poultry judges were again supplied with judges by the Department. Each succeeding year the utility classes show larger entries. The so-called ultra-fancy breeds are seldom shown now at any of the fall fairs, with the exception of one or two travelling poultrymen from Eastern Ontario who attend the larger exhibitions in the Province. The associations having classes for single-bird exhibits are increasing, and this is as it should be.

PUBLICATIONS.

The leaflet entitled "Hints on Egg-hatching" was published early in the year and proved to fill a long-felt want. During the hatching period especially very many copies of this leaflet were sent out to inquirers for same. Articles dealing with different phases of the poultry business were supplied to the poultry journals of the Dominion, our Department's publication, the *Agricultural Journal*, and to various newspapers in the Province. The monthly records of the Department's Egg-laying Contest were distributed to all parts of the Empire and the United States.

OFFICE-WORK.

During the year the following totals of mail were received and delivered by the Poultry Division: Inward letters, 1,857; outward letters, 3,295. Not a few of the communications received were from returned soldiers taking up poultry under the Soldier Settlement Board. During the first part of the season the Island branch of the Board had a Poultry Instructor around visiting the men. This official resigned on September 1st, with the result that most of the settlers under the scheme came to this Division for assistance and advice.

ARTIFICIAL ILLUMINATION OF POULTRY BUILDINGS.

A considerable number of poultrymen during the year have installed electric-lighting plants for the purpose of illuminating the hen-houses during the winter months, as mentioned in the concluding paragraph of last year's report. This year, however, owing to the mild winter, the egg yields have been phenomenally high, with the result that there have been a large number of complaints regarding partial paralysis, ovarian trouble, and sudden deaths amongst pullets where electric lighting has been used.

The writer is of the opinion that only the thoroughly experienced poultryman should avail himself of the artificial lighting. Several plants visited upon request have been found to contain birds very much out of condition owing to the forcing of the birds for egg production through the use of lights and feeding of very rich rations.

In conclusion, the writer wishes to testify to the uniformly good work of W. H. Stroyan, the poultryman in charge of the Egg-laying Contest. Whenever possible the latter official has been of much assistance in connection with the enforcing of the "Eggs Marks Act" in Victoria.

Respectfully submitted.

J. R. TERRY,
Chief Poultry Instructor.

REPORT OF SILO DEMONSTRATOR, VICTORIA.

R. J. Ferris.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith the annual report of my work as Silo Demonstrator for the year 1920.

During the past year the construction of three silos was supervised at St. Mary Prairie, Wycliffe, near Cranbrook. There being no silos in the Nechako Valley, two were built under the direct supervision of this Department. These were filled with the Department's silo-filler. Another was built at Keating, and a large number were built on the direct instructions of the Silo Demonstrator through the mails, this including ordering of lumber and hardware, etc. Two silos were filled in the Keremeos District.

Cement Silos.—We have now two sets of silo forms. One set is in use in the Okanagan, and cement silos were built at Kelowna and Vernon.

Late in the season a new set of forms was purchased and a cement silo built at Chilliwack. This set of forms is modern and will be extensively used this year when the winter season is over.

Respectfully submitted.

R. J. Ferris,
Silo Demonstrator.

REPORT OF DAIRY COMMISSIONER, VICTORIA.

H. Rive, B.S.A.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my report as Dairy Commissioner for the year 1920.

General.

The industry has experienced no special advance during the past season. Totals of dairy production show a moderate increase only over the previous year.

The weather, favourable enough during the early part, later became most unfavourable to farm operations, and the excessive rains that affected the Province in general caused serious losses in fodder-stuffs throughout.

Prices for dairy products have been much as in 1919. A slight raise towards the fall was experienced. Prices of dairy feeds have lately been reduced, bringing some relief to producers of milk, who have long paid at excessive rates for mill-feeds and concentrates.

In the month of March T. A. F. Wiancko, since 1913 Dairy Instructor with the Department of Agriculture, resigned his position to go into business in Toronto. Mr. Wiancko gave good service to the Province, being of long and wide experience in dairy-work, and his removal is a loss to this branch.

Creameries.

Through the loss of the member of the staff as noted less time than usual was spent amongst the creameries and creamery patrons. Calls were made whenever possible on all factories.

The installing of two new creamery plants by the Department of Agriculture also interfered with routine work. These were at Vanderhoof, Nechako Valley, and at Quesnel, Cariboo District. At Quesnel, no suitable building being available, a creamery was erected with good arrangements for cold storage. Owing to the prices for dairy products obtainable from railway-construction camps in the neighbourhood it was decided to defer the opening till next season.

At Vanderhoof the creamery commenced operations about June 7th. During the season some fifty patrons supplied cream, concluding for the season on December 15th.

The prospects are for a large and successful business within a very few years, as the district is in every way suited to the industry. Both plants installed are modern and complete in every respect. A new creamery was also opened at Vernon during the summer.

A list of creameries, condenseries, cheese-factories, and ice-cream factories of the Province is herewith appended.

EDUCATIONAL BUTTER-GRADING.

A circular couched as below was prepared and sent to creameries. For the purposes of the work three districts, the Lower Mainland, Vancouver Island and Gulf Islands, and the Upper Country, were decided upon.

.....DISTRICT.

.....CREAMERIES.

Commencing May 1st, 1920.

To obtain for the creameries of British Columbia the benefits of commercial grading of butter in the absence of such a system in this Province, the Department of Agriculture has secured cold-storage space with the ..... Cold Storage Company, and invites the creameries of this district to send in as often as they desire 14-lb. boxes of butter to be graded.

The Department undertakes to have this butter scored at least once a month by some representative of the wholesale trade. Scores and comments will be forwarded immediately to the creameries and the butter disposed of according to directions.

The scores will be returned separately and privately, or in list form including district, as the creameries decide.

The system can be of great service in establishing clearly to all interested the exact standards and requirements of our wholesale markets.

Make Use of it.—Check up your ideas of butter by sending in regularly. If uncertain whether one batch of cream grades first or second and another first or special, note all particulars and send in box of the butter. Express must be prepaid.

Give directions for disposition of butter after scoring.

Arrangements were made with Mainland Ice and Cold Storage Company and the B. Wilson Company.

Samples were received from several creameries during the early months of summer. A. P. Slade, of Vancouver, scored the butter and gave assistance and encouragement to the scheme. The opportunity afforded the educational work was not fully taken advantage of.

The conclusion in this regard can only be that until the butter production of this Province becomes several times greater than it now is most of it will be disposed of by creameries chiefly through local sales, A minute portion only of the butter manufactured finds itself on the wholesale markets in direct competition with imported butters, and the necessity for grading, standardizing, and checking up according to quality is less evident to creamery-men than would be the case were British Columbia exporting butter in direct and severe competition with other dairy countries.

DOMINION EDUCATIONAL BUTTER-SCORING CONTEST.

Four creameries were selected to take part in the Dominion contest. Owing to a series of changes and accidents one only continued sending butter to Montreal throughout the season.

The invitation to attend the October scoring was given by J. A. Ruddick, Dominion Dairy and Cold Storage Commissioner, but owing to absence of assistance at this time it was not found possible for a representative from this Branch to attend.

CHEESE-MAKING.

No new cheese-factories have been established during the past season. Three cheddar-cheese factories and one for fancy cheese are to be found. Several farm dairies produce soft varieties, but no effort at standardization has yet occurred.

Information regarding half-cream or other soft, quick-curing varieties suited to farm production can be secured from the Dairy Department of the University of British Columbia and from the Dominion Experimental Farm at Agassiz.

In view of the quantities of fancy cheese imported retailing at high prices, the subject is one that should be of interest to the Women's Institutes of the Province for the supplying of farm tables aside from commercial purposes.

CONDENSERIES.

Two condenseries, situated at Ladner and Abbotsford respectively, are now in operation. Both are operated by the Pacific Milk Company and produce only sterilized milk. At present

neither the condensed (sweetened) nor the evaporated varieties are manufactured in British Columbia.

The Borden Milk Company's condensery operating at Sardis for several years has since the spring been closed on account of shortage in supplies. The Courtenay Condensed Milk Company, Limited, no longer is in operation, the plant having been acquired by the Pacific Milk Company, Limited, and removed to Abbotsford.

Ice-cream Manufacture.

This phase of dairy manufacture, regarded formerly as a side-line for city plants only, has now assumed considerable proportions in this Province as elsewhere. Few creameries exist that do not cater to the wholesale ice-cream trade and several institutions are to be found concerned with little else than the manufacture of this now generally recognized dairy food.

Dairy Legislation.

The "Creameries and Dairies Regulation Act" now replaces the "Dairies Regulation Act," the "Milk Fraud Act," and Part VI. of the "Agricultural Associations Act," which are rescinded.

Dairy and Creamery Licences during 1920.

To forty-seven persons or companies buying milk or cream on the butter-fat basis licences for businesses were issued. (List of creameries or dairies so licensed appended.)

Testers' Licences during 1920.

Nine candidates were examined by the Dairy Branch and sixty-four licences were issued. (List of testers holding licences appended.)

Check-testers appointed by this Department.

E. Rive, for several years check-tester in Vancouver, resigned this position in September to work for the Pacific Milk Company, Limited. He has not been replaced, the Act not providing for further appointments.

An extract from the report of the check-tester at Sardis is given herewith:—

"During the months of January and February your tester's time was occupied in taking samples and testing at the Borden Condenser at South Sumas. Owing to the closing of that plant the month of March was occupied in similar work at the Chilliwack Creamery. From April to August, inclusive, charge was taken of the sampling and testing at the Sardis Cheese-factory. The remainder of the year was spent at the Chilliwack Creamery, which handles the milk from 450 to 500 shippers, and where the work entailed on an average of about 1,200 tests per month.

"J. B. Watson."

Cow-testing—Milk-record Work.

On April 1st G. H. Thornbery, who for several years has been actively engaged in testing-work under this Branch, was taken on as temporary assistant in charge of cow-testing work and has rendered good service. An extract from his report is given herewith:—

"At the present time there are five Cow-testing Associations in operation in the Province, situated in the Chilliwack, Comox, Kelowna-Vernon, Langley-Surrey, and Richmond Districts.

"The Department continues its support of this work by contributing on an average $50 per month to each association towards the tester's salary. The total amount paid out by the Department in this way is $3,545. Attached is a list giving full particulars of the associations, also showing the total amount received by each.

"The year's work has been very satisfactory when taking into consideration the fact that there has been a large number of dairy-farms change hands. This, of course, means that these herds, in many cases having a very high average of production, are no longer intact.

"It is not possible to give with the aid of figures an adequate idea of the benefits that the members of Cow-testing Associations have received, although from the list attached it will be noted that there are some very satisfactory increases in the average production per cow.

"We consider that the advantages to be derived from this work may be largely increased by the adoption of some feeding system such as is used with marked success by those European countries, which are leaders in the economical production of milk. By this means the dairyman

will be able to make better use of the results obtained by the tester each month. It will give him a better idea whether he is feeding his cows too much or not enough, or, in other words, whether he is producing milk as economically as possible.

"*Testing Centres.*—Owing to a demand for cow-testing work from districts that have not as yet a sufficiently large number of cows to be able to support a regular association, the Department has formulated a scheme whereby dairy herds in these districts may be improved until such time that they can keep a tester busy all the time.

"To any district which contains fifty cows, whose owners wish to have them tested regularly each month, the Department will loan a complete testing outfit and where necessary will train some one to operate same. The farmers will take their own samples, bringing them to the tester once a month.

"The Department will bonus each testing centre to the extent of 7 cents a test and farmers will be charged 5 cents a test. In this way money will be forthcoming to pay the tester for work done each month.

"The money expended by the Department under this scheme to the end of December, 1920, is $41.58 for new outfit and refitting additional outfit, and $20 paid testing centres for tests.

"*Official Tests.*—As in previous years, testers have been supplied for Holstein Advanced Registry tests, which have been conducted at the following places: The Colony Farm, Essondale; J. M. Steves, Steveston; Dominion Experimental Farm, Agassiz; Annacis Stock Farm, Limited, Annacis Island.

"The departmental allowance of $1 per day to testers when supplied to private parties and transportation expenses has amounted to $114.

"Following is a brief report of each association:—

"Chilliwack Association returns show a decided improvement in the average production per cow over last year, both in the milk and fat yield. The annual statement indicates a balance on the right side, although there is a large proportion of unpaid accounts.

"Returns from the Comox Association for the year 1919 are not quite as good as those of the two previous years, although they still hold the first place for the average yield of fat per cow. This drop in average was to have been expected, as there has been an unusually large number of dairy-farms change hands. Frequently the herds, which in many cases were high producers, have been sold by auction, and in this way are distributed over a large area and so lost sight of as far as the association is concerned. The financial condition of this association is very satisfactory.

The records sent in from the Delta Association during the year, which were completed in 1919, show a slight decrease in the average production of butter-fat per cow, although the milk yield has not altered. It is regrettable that this association has not been in operation since February.

"The Langley-Surrey returns indicate a decided increase in the average production per cow, both for milk and fat. This association has a higher average at the present time than at any time since it was instituted in 1914. The finances are in a satisfactory condition.

"Conditions at Dewdney have made it necessary to stop association-work for the time being. The circumstances that have led up to this state of affairs are several, but it is chiefly due to having an unsatisfactory start and the very severe floods which destroyed so much winter feed, forcing a large number of dairymen to sell their cows.

"The Richmond and Kelowna-Vernon Associations, the latter being instituted in April of this year, have not had everything running as smoothly as might have been desired. They have each had a change of testers three times during the last year, a condition not conducive to the best results. However, from now on we hope these associations will rapidly improve.

"G. H. THORNBERY."

FALL FAIRS.

Owing to a change in and addition to the dairy prize-lists at the three principal fairs the supervision of dairy-produce classes was heavier than heretofore, and these exhibitions only were attended in any official capacity by a representative from this Branch. Summer classes were introduced calling for butter to be shipped in May and June to cold storage till exhibition-time. These classes are popular with butter-makers and good exhibits were on hand at these fairs. The judging was done by A. P. Slade, of Vancouver.

Display, British Columbia Dairymen's Association Annual Convention, Empress Hotel, Victoria, February 8th, 9th, 1921.

Crop of timothy in the Bulkley Valley, near Smithers.
(Hudson Bay Glacier in distance.)

Vanderhoof dairy herd, showing type of log barn used.

British Columbia Dairymen's Association.

The affairs of this association have, as usual, taken considerable of our time. Matters proceed along similar lines as heretofore. Competitions are held and prizes offered where benefit to the dairy industry can result. A very successful phase of the 1920 convention at Vancouver was the display of milk values at the Hotel Vancouver. A similar display is contemplated at the Empress Hotel, Victoria, at the time of the association's convention in February next. Refunds on transportation charges on pure-bred dairy stock have been paid during the year. Dairy literature and charts from the National Dairy Council advocating the use of dairy products have been brought in and distributed.

Conclusion.

The industry in British Columbia, while showing increase and development, requires the backing of several thousand more dairy cattle than it now possesses.

Demands for assistance in establishing dairy factories are becoming frequent, but chiefly from districts whose first requirement is more dairy stock.

Respectfully submitted.

Henry Rive,
Dairy Commissioner.

REPORT OF PUBLICATIONS BRANCH, VICTORIA.

R. J. Ferris.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith the annual report of the Publications Branch for the year 1920.

The *Agricultural Journal* is approaching the end of its fifth year of issue. At the present moment the circulation is 9,500 monthly. Numerous letters are reaching the Editor which claim that the *Journal* is filling a much-needed place in the farmers' life of this Province. This applies particularly to the settlers who are striving to make a living against natural disadvantages.

Up to the present all special articles forwarded to the *Journal* have not been paid for. The material used is sometimes the cause of controversy, though the object is to exhibit and interpret from a service view-point the economic needs of the farming industry.

Publications Branch.

We have received 3,777 letters applying for various bulletins. Special reference is made to the fact that day-school teachers in all parts of the Province are writing for agricultural bulletins.

Respectfully submitted.

R. J. Ferris,
Editor.

REPORT OF STATISTICS BRANCH, VICTORIA.

G. H. Stewart.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith the annual report of the Statistics Branch for the year ending December 31st, 1920.

Scope.

During the past year most of the time of your Statistician has been devoted to the collection of data relating to agricultural production, imports, and exports. In obtaining figures relating to crop areas and the numbers of live stock, the fullest co-operation has existed between the Dominion Bureau of Statistics and this Branch.

At the end of May card schedules were mailed to every farmer in the Province to be filled in and returned to this office where the compilation was completed. Data relating to imports from other Provinces in Canada are collected by means of returns forwarded to this office from the various distributers of agricultural food products in the Province. A total of 980 returns were sent out, and of this number 956, or 97 per cent., have been filled in and returned to this office. Data relating to imports and foreign countries are obtained from the Dominion Department of Customs. Returns relating to the "census of dairy factories" have all been sent out and are returnable to this Branch at the end of the present year, when the compilation will be completed.

CROP CORRESPONDENTS.

At the beginning of the present year this Branch appointed 102 reliable farmers from all sections of the Province to act as crop correspondents. Their duties in brief consisted in sending monthly reports to this office, dealing with the condition of crops, climatic conditions as affecting crops, average yields, prices, etc. By adopting this system this office was at all times able to give reliable information regarding the condition of crops.

The Dominion Bureau of Statistics also appointed a like number of correspondents, but entirely different to those reporting to the Provincial office. At the beginning of each month the different offices compiled the figures and the results exchanged, when final averages were agreed upon. This assured a greater degree of accuracy, at the same time preventing the publication of conflicting figures.

POSTAL CENSUS, 1920.

The total number of cards mailed to individual farmers was 15,804; compiled, 8,694. The following were returned blank, etc.:—

"Removed" or "gone away"	210
Returned by recipients "not farming"	224
Returned noted "dead"	52
Not called for at post-office	511
Returned by post-office "unknown"	312
Total	1,309

The estimated number of actual farmers is 14,495 after deducting the 1,309 cards returned by the post-office. The total number compiled would therefore be 60 per cent. of the estimated total farmers, to which was added 40 per cent. of the latter total.

Since 1917, when the system of collecting these returns was first adopted, there has been a steady increase in the number of returns received, as the following figures extracted from the Monthly Bulletin of Agricultural Statistics for October, 1920, will show.

It will be seen that the Province of British Columbia again takes first place above all the other Provinces in the Dominion.

Province.	Number of Farms, 1920.	Number of Returns.				Percentage of Returns.			
		1917.	1918.	1919.	1920.	1917.	1918.	1919.	1920.
Prince Edward Island	13,705	.....	7,766	3,770	4,887	...	55.0	27.0	36.0
Nova Scotia	53,634	.....	20,868	12,136	16,249	...	38.0	24.0	30.0
New Brunswick	37,204	.....	13,937	6,643	7,266	...	36.0	17.0	19.5
Quebec	143,958	28,133	34,894	24,735	19,076	21.0	20.0	17.0	13.0
Ontario	184,337	.....	79,968	36,213	31,342	...	43.0	19.0	17.0
Manitoba	49,855	.....	17,808	10,536	16,738	...	88.0	21.0	33.0
Saskatchewan	103,912	35,592	46,089	35,531	35,939	34.0	44.0	34.0	34.6
Alberta	67,603	14,444	13,574	4,919	14,454	21.0	20.0	7.0	21.0
British Columbia ...	14,495	6,886	6,534	7,970	8,694	46.0	42.5	58.0	60.0
Totals	668,703	.....	241,438	142,453	154,661	...	36.0	21.5	23.0

Farm Accounting.

Owing to numerous requests being received from farmers in all sections of the Province, and believing that the time had arrived when the farmers should keep an up-to-date and accurate record of all the business transactions on the farm, a "Farm Account Book" was designed by this Branch and printed early in the year. There has been a steady demand for this book, and of the 1,000 copies printed but 200 copies remain to be distributed.

General.

The total number of letters received by this Branch during the year was 1,960, while the total number of letters dispatched was 1,364. During the year twenty circular letters, comprising in all 3,460 letters, were sent out to crop correspondents, Farmers' Institutes, manufacturers of dairy products, etc.

In addition to this, five circular letters relating to crop conditions were sent out and published in all the leading newspapers of the Province, as well as two articles in the *Agricultural Journal.*

During the summer, with the assistance of W. H. Robertson, of the Horticultural Branch, a small-fruit survey of the entire Lower Mainland section of the Province was made, the results of which have been submitted to you.

The Agricultural Statistics Bulletin for 1919 was published. Of the 1,200 copies printed, only 260 copies remain to be distributed.

With the compilation of the June census returns, the monthly returns of crop correspondents, together with the attention given to correspondence and other routine matters, the entire time of your Statistician has been fully taken up.

All of which is respectfully submitted.

G. H. Stewart,
Statistician.

REPORT OF CHIEF INSPECTOR OF APIARIES, NELSON.

W. J. Sheppard.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my report as Chief Inspector of Apiaries for the Province, together with the reports of the Inspectors for Vancouver Island and Gulf Islands, Greater Vancouver, Lower Fraser and Upper Fraser, and the Okanagan, for the past season.

The season of 1920 was a poor one for honey production in British Columbia. Owing to the abnormally dry weather conditions during the period of the honey-flow, in July and August, the flowers did not yield nectar to the usual extent. In some favoured localities, such as the irrigated districts, and where sufficient moisture was retained in the soil, the honey crop was equal to the average. This shows that the advantages of irrigation are not confined to increasing the production of fruit and farm crops, but that the honey-crop is benefited as well.

With the exception of the Fraser Valley, the whole of the Province is practically free from foul-brood diseases. In the Fraser Valley, where European foul-brood has been found to exist to such an alarming extent, the four Inspectors working in this territory have had a hard task in devoting their energies to obtain control of this disease, in which they have made considerable headway. It is very important that this work should be continued, as, if the disease is allowed to get beyond control and spreads to the other parts of the Province, this new and important industry, which is steadily growing and is capable of great development, will have a set-back from which it may never recover.

Owing to the protection afforded under the provisions of the "Apiaries Act," which is gradually becoming widely known, experienced bee-keepers from different parts of the world are looking to this Province as a desirable place to live and embark in this enterprise on commercial lines. Some have already come in and found suitable locations and others are expected to arrive next season.

The fact that the education of the bee-keepers in modern methods of bee-keeping has an important bearing in controlling bee-diseases has not been lost sight of, and outdoor demonstrations and lantern lectures have been given by the Inspectors wherever audiences could be obtained, in addition to their giving all the information possible at each apiary visited.

The honey exhibits at the agricultural fairs have been of much educational value in demonstrating the superior quality of British Columbia honey and the possibilities of increasing its production.

Respectfully submitted.

W. J. SHEPPARD,
Chief Inspector of Apiaries.

REPORT OF DEPUTY CHIEF INSPECTOR OF APIARIES, LOWER FRASER DISTRICT.

W. H. TURNBULL.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for the past season in part of Surrey, Delta, Richmond, Pitt Meadows, and Maple Ridge Municipalities, and also Coast islands, as follows:—

Regular inspections made	152
Special inspections made, outside regular work	45
Apiaries found affected with European foul-brood	82
Apiaries treated by Inspector	34
Apiaries treated by owners	48
Apiaries visited on special tour to Coast islands	35
Lantern lectures given	12
Practical demonstrations held	6
Extracting demonstrations given	5

By request a special tour of inspection was made in the Coast islands, where thirty-five apiaries were visited. European foul-brood was found over the whole territory inspected, with the exception of the Coast islands, where there was no trace of any disease. Very little foul-brood was found in Pitt Meadows and Maple Ridge Municipalities. A noticeable feature of the past season has been the largely increased crops of honey that have been obtained by bee-keepers who have now learned how to combat European foul-brood and keep it in check. There are at present several apiaries containing over fifty colonies, the owners of which are practically making a living out of their bees.

The compensation paid for combs destroyed by order of the Inspector has been much appreciated by the bee-keepers.

Respectfully submitted.

W. H. TURNBULL,
Deputy Chief Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, VANCOUVER ISLAND AND GULF ISLANDS.

F. DUNDAS TODD.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for Vancouver Island and Gulf Islands for the past season.

On the opening of the season's work in April I spent the first three weeks on special calls, mostly round Victoria; then proceeded to the Duncan District, where I worked until the middle of May. The Nanaimo-Alberni District kept me occupied until the middle of July. For a week I worked the Comox Valley; then proceeded to the easily accessible islands in the Strait of Georgia, which kept me occupied until August 5th. Two weeks were devoted to an examination

of the honey possibilities along the line of the Grand Trunk Pacific Railway; then a visit to the Campbell River country and a few of the more inaccessible islands in the straits kept me busy until the end of the first week in September. The rest of the month was given to agricultural exhibitions in Vancouver, Victoria, New Westminster, Duncan, and Parksville.

The season was decidedly unfavourable for honey production. April, May, and June were cool and wet, retarding the development of the colonies, while July and August were so dry that nectar was not secreted in the plants to the usual extent.

Respectfully submitted.

F. Dundas Todd,
Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, GREATER VANCOUVER DISTRICT.

Alex. Keir.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—I beg to submit my report on the past season's work as Inspector of Apiaries for Greater Vancouver District.

Adverse weather in April, May, and June delayed work considerably, and in consequence several districts in Vancouver, though visited, were not fully inspected.

During the season 1,471 colonies of bees were inspected; 455 colonies in 143 apiaries were found affected with European foul-brood and 243 frames of comb affected with European foul-brood were destroyed.

American foul-brood was found in thirteen apiaries, thirty-eight colonies being affected. Half that number were in one apiary in Lochdale District. Four apiaries in which colonies were destroyed or treated last year had the disease present this year. Nine colonies affected with American foul-brood were destroyed, the rest being treated; 516 frames of comb, which were on hives affected with American foul-brood, were destroyed.

The honey-crop this season has been very poor and in many apiaries no surplus has been secured. Fireweed, on which we depend for our principal honey-flow, yielded little, if any, nectar owing to the overdry, hot weather during July and August. There was an entire absence of honey-dew, but the bees worked on overripe fruit, principally raspberries, during all the month of August, which showed a dearth of nectar in the flowers then in bloom.

Prospects were not bright for good wintering. Stores are in many cases short, while there is too much unsealed honey in many hives. Queens stopped laying early in September, so that there is a shortage of young bees.

Low temperatures and continuous rains have prevailed all through September and October.

Respectfully submitted.

Alex. Keir,
Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, LOWER FRASER AND CHILLIWACK DISTRICTS.

A. W. Finlay.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—I beg to submit my report on the past season's work as Inspector of Apiaries in the Lower Fraser and Chilliwack Districts.

Apiaries inspected	230
Apiaries found affected with European foul-brood	71
Frames of comb destroyed on account of European foul-brood	750
Lantern lectures given	12
Practical demonstrations in the field	5

Owing to the unfavourable weather conditions the season has been an unusually bad one, both for honey production and for the treatment of bee-diseases. The spread of European foul-brood has also been greatly facilitated by the lack of nectar in the flowers.

A very marked improvement in methods of bee-culture has been noticeable this year, due partly to the instructive lectures and practical demonstrations that have been given by the Inspectors and partly to the elimination of careless bee-keepers, who, rather than register under the requirements of the "Apiaries Act," have preferred to go out of the business.

The interest and enthusiasm of the commercial bee-keepers has in nowise diminished in consequence of the unfavourable conditions of the past two seasons. With their apiaries and equipment in better shape than formerly and with superior Italian stock, they are looking forward to increased production in the future.

Respectfully submitted.

A. W. FINLAY,
Inspector of Apiaries.

REPORT OF ASSISTANT INSPECTOR OF APIARIES, LOWER FRASER DISTRICT.

H. L. CHITTENDEN.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for the past season in part of Surrey, Langley, and Matsqui Municipalities.

The inspection-work was commenced on May 1st and it was found that European foul-brood was present in a large proportion of the apiaries visited. With a few exceptions, there had been no previous inspections made in this territory before. The major portion of the colonies was found to be housed in poor, badly constructed hives, and very little attention had been given to the bees. Most of the bee-keepers were ignorant of the most elementary principles of apiculture. In all probability European foul-brood has been prevalent here for some years past, but the owners of the bees have been ignorant of the fact, not knowing how to distinguish the disease.

Respectfully submitted.

H. L. CHITTENDEN,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, OKANAGAN DISTRICT.

W. H. GRAY.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit the following report of inspections and general conditions in the Okanagan District during the past season:—

The honey-crop was below the average and in parts of the southern end of the Okanagan Valley was practically nil. The crop seems to vary with the rainfall, unless there is a large expanse of irrigated crops, such as alfalfa or white clover, or else sub-irrigated land, where the numerous wild honey-plants grow. For instance, Penticton is poor, while Summerland is very good, and the rainfall is similar. At Kelowna a strong hive placed on scales during the honey-flow showed a maximum increase of 1½ lb. for any one day, while at Vernon 5 or 6 lb. per day came in for several days.

Armstrong and Enderby are very good bee districts, as the rainfall is sufficient for general crops without irrigation. Going north and west, the dry country is again entered. Here large crops of alfalfa are raised which yield excellent honey.

There were two outbreaks of American foul-brood, the worst being at Armstrong, where twenty colonies in one apiary were affected. All were treated by the shaking method, and at latest reports there had been no recurrence of the disease. In spite of careful search and tracing the origin of the hives, the outbreak could not be accounted for, except on the theory

that the bees carried the infection from imported honey adhering to empty containers that had been thrown out. A single case occurred in a small apiary at Kelowna, but as there had been foul-brood in this district before, it was not so remarkable as the Armstrong outbreak.

Owing to the high price of bees many people sacrificed their honey-crop by working for increase rather than honey.

The winter losses throughout all this district are generally very heavy, due entirely to lack of winter protection and adequate honey or sugar supplies.

Weekly articles were published in the Kelowna *Courier* on the local needs and problems of the industry. It was the endeavour of the Inspector to help as much as possible all those anxious to improve their methods.

Respectfully submitted.

W. H. Gray,
Inspector of Apiaries.

REPORT OF SECRETARY OF BRITISH COLUMBIA WOMEN'S INSTITUTES.

Mrs. V. S. MacLachlan.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—It is again my privilege to submit for your consideration the annual report for the Women's Institutes of British Columbia.

The record of the past year has been one of greatest advancement, not alone in the numbers of new institutes, but in the amount of organized work accomplished. With your approval, it is the record of actual organized effort and accomplishment with which this report will deal rather than with figures.

The present period is one of agricultural development, and with this development is a corresponding demand on the Education and Health Departments, because it is these departments that provide the improvement of rural conditions which make "settlement permanent and prosperous in the farming districts." The people in the rural districts are demanding the right to live under conditions which will promote physical, mental, and moral well-being. This is their right and the right of the children in the rural districts. The improvement of rural conditions is not the problem of the individual, but the problem of the community, and can only be successfully handled by organized effort.

The stability and prosperity of settlement in the country districts is one of the vital questions which the Governments of to-day are facing, and the Women's Institutes, whose function is primarily that of disseminating knowledge, are the logical agents to assist in satisfactorily solving this question. Acting in the capacity of an "advance agent," they can and are promoting and developing public opinion to the need and the remedy.

The motto of the institutes is "For Home and Country." The aims and objects must relate to the improvement of rural conditions, and to carry this out the particular aims of an institute shall be the study of home economics. The figures published of the results of the medical examination of school-children show that the standard of health in our homes is not all that we imagined, yet on the standard of health in the individual home depends the efficiency of the nation. The study of home economics, then, is one of national importance.

By making use of the "Travelling Libraries," containing 20,000 volumes, members of institutes can obtain books on almost any subject, and in respect to home economics, H. Killam, Superintendent, has secured for the use of all who may desire the latest editions of books on all branches of home economics. Again, through the generous provision of the Education Department we are able to put on courses in all subjects pertaining to the welfare of the home, farm, or community through the night-school classes.

Method of Procedure.—The plan recommended and found successful so far is for the institute to act as a promoting agency and organize a class of, preferably, fifteen or twenty in order to guarantee an average attendance of ten. It has been found best for the members of the institute or class to have a desirable instructor in view, and not to depend upon the Department of Education. When the class has been organized the members approach the Board of School

Trustees, and ask them, not to finance, but to merely be the instrument for engaging this instructor, whose salary will be made up of the Government grant and the members' fees. If the class is held in the evening in the school-house, the heating, lighting, and transportation of the instructor must be provided by the class or institute. In no case need the School Board meet any expenses.

The Government grant is always four-fifths of the salary; for example, if the salary is $5 a lesson, the Department of Education will pay to the School Board towards that fee $4; the remaining dollar will be made up of the individual fees. It is not necessary to hold the class in the school-room or at night. The instructor does not have to be a certificated teacher, but must be competent to give instruction on the chosen subject. The institutes which have organized these classes so far report satisfactory results, whilst others report interest and progress in securing information in order to be in readiness to proceed as soon as a sufficient number join or a teacher is procurable.

Colwood has organized two classes in dressmaking, one in the Colwood School District and one in Luxton District. Gordon Head reports efforts at organization. North Saanich two classes as one was so large as to be unwieldy. This institute is most fortunate in the support received from the Board of School Trustees, who, for the convenience of the class, had electric light installed in the school-room. Strawberry Vale reports a class in dressmaking and one in millinery. Cowichan, dressmaking; West Saanich, millinery. Garden City, Mount Lehman, Upper Sumas, Rutland, West Summerland, Bonnington, Rock Creek, and Willow Point report efforts to organize a class.

This movement has just started during the year, and from the success reported it is confidently expected that many more subjects will be included this coming year. There is a great future for instruction through the means outlined in all branches of manual arts, and it is cause for congratulation to note the appreciation of our members in making use of this advantage. Inquiries have been made as to the Department securing instructors who would take a group of institutes and devote full time to giving instruction, provided, of course, a sufficient number of institutes would agree upon one course and be able to make up the salary. Thus the institutes are able to raise the standard in the home through these courses.

Provincial statistics have shown that country people and their children are suffering from more physical defects and are on the whole less healthy than the people in the cities. Recognizing these facts, the Department of Health is undertaking the establishment of health centres throughout the Province, and beginning with these health centres and unifying all the agencies, both voluntary and public, for the promotion of health through childhood and beyond, British Columbia will have established the most thorough system of public health perhaps in existence in the Dominion; a system which, if carried to a triumphant and logical conclusion, will indeed provide the best rural conditions and make the Province a Mecca for farming population. But to quote from the Twenty-third Report of the Board of Health: " . . . the success of this movement will depend upon the continued interest of the women, and the best means of reaching the people of British Columbia is through the Women's Institutes."

Practically all the institutes are united in the desire for a public-health nursing service and are making efforts to establish a health centre and Public Health Nurse in the immediate district. Following the example set by Cowichan, Colwood, Langford, and others in 1919, Creston Women's Institute took the lead in its community and organized the Public Health Committee. The district was thoroughly canvassed and $25 a month guaranteed towards the nurse's salary. This district was then recommended by the Department of Health to the Red Cross Society, which made up the remainder of the salary. As soon as available a duly qualified Public Health Nurse was installed. There was no dearth of work. The interest and support increased, and recently a small house was secured, remodelled, and furnished by the institute, and Creston has a health centre and Public Health Nurse due to the organized effort of the Creston Women's Institute.

All institutes are working towards one goal—namely, the support of the nurse through the most equitable source, taxation—and at present the following legislation can be used, aid given to School Boards who desire to employ a school nurse: Cities of the first class receive $460 grant per nurse or dentist; cities of the second class receive $520 grant per nurse or dentist; cities of the third class receive $565 grant per nurse or dentist; municipal and rural school districts receive $580 grant per nurse or dentist.

An example of monthly salary: If the School Boards of a municipality or rural school district decide the nurse's salary at $125 per month for the twelve months of the year, the Government will grant $48.33 per month. This leaves a balance of $76.67 per month for the School Boards to make up. While no one rural school district could attempt to raise that amount, in a group of from five to seven school districts each could at the annual school meeting vote its proportional share of this sum, which would be $10 (slightly more or less) per month per school district. This would not work a hardship on any individual district, and yet it provides the salary required.

There still remains the question of transportation for the nurse, because in rural districts most of the time would be spent walking from one case to another. Here is where the organization such as our institutes could render signal service by raising funds to guarantee this necessary means of conveyance. I hope the organizations can see their way clear to promote and organize public opinion in order that the trustees may feel they are carrying out the wishes of the people in voting this salary. After the residents of any district have experienced the advantages of this nursing service for one school term, nothing would induce them to do without it.

British Columbia is the only Province of the Dominion where medical inspection of school-children is compulsory, and with strong public sentiment behind this it can be made very effective. With this end in view the Provincial Board of Health has appealed to the Women's Institutes to make it effective, and the following letter speaks for itself:—

"Provincial Board of Health,
Victoria, B.C., May 6th, 1920.

"*Mrs. M. J. Simson,*
Secretary, Women's Institute, Haney, B.C.

"Madam,—I am in receipt of a letter from Dr. Morse in regard to his examination of the schools, and he mentions in the report, in regard to the request for the attendance of the parents, that the response has not been marked except in Haney, where the Women's Institute attended.

"I would like to have you convey to the members of your institute the appreciation of the Department of the interest they have taken in the work. The Women's Institutes could do so much to have the examination carried out in the way that the Department wishes if they would only evince such interest as your institute has done.

"Thanking you for the same, I remain,

"Yours truly,
"H. E. Young,
Provincial Officer of Health."

Along with the desire for the Public Health Nurse is the effort to consolidate the schools in the rural districts. So far there has been no direct results, but the effort is increasing and public opinion growing in favour of the consolidated school.

In improving school conditions the institutes have always been prominent. There is an ever-increasing demand for women on the School Boards, and the following institutes report members on the Board of School Trustees: Colwood, 2; Okanagan Centre, 1 on each of four School Boards; Langford, 2; North Saanich, 1; Tappen, 1 member on each of four School Boards; while those supplying hot drink or milk for school-children are Cowichan, Gordon Head, South Vancouver, Barriere, Armstrong, Mount Ida, Burton, Creston, and Crawford Bay. Playground improvement and equipment, Peachland, Tappen, Bonnington, North Saanich, Shawnigan, Strawberry Vale, and Langley Triangle.

Many institutes have carried out splendid local improvements. Chief among these are Matsqui, Mount Lehman, Naramata, Burton, and Tappen. Institutes purchasing pianos are Langley Fort, Tynehead, and Crawford Bay. Those reporting a library, travelling or public, are Surrey, Upper Sumas, Salmon River Valley, Bonnington, Harrop, Willow Point, Cowichan, Comox, North Saanich, Strawberry Vale, South Saltspring Island, Langley Fort, and Burquitlam. Other activities worthy of note is the successful effort of Oyster in installing domestic science in the school; West Saanich in purchasing piano for the school-children; Garden City in organizing and conducting the Girls' Club; Surrey, the Boys' Club; Kalamalka, the Juvenile Fair; and Salmon Arm with its record-breaking schools competition at the fall fair.

The subject of legislation is growing in popularity, many institutes inquiring for copies of all recent humane legislation and planning a part of the programme for discussion on the different Acts on the statute-books.

More and more the institutes are being used as the social centres, and soldiers' wives receive especial attention and through the institute become an integral part of the community.

As the yearly programmes are received, it is noted that all report one or more of the twelve meetings devoted to some phase of agriculture or home industry. Lectures on different branches of agriculture may be had from the Department of Agriculture, District Representatives, British Columbia University, and Dominion Experimental Farms. The Women's Institute Branch is fortunate in having in yourself an official of such long and successful public experience, both in Federal and Provincial welfare, who is so keenly alive to the importance of our work, and I am confident that under your guidance and continued sympathy the expansion of the Women's Institute work will be gratifying to yourself and satisfactory to the Province.

Four very successful conferences were held, two of which, however, were postponed to January. The question of Provincial Federation was discussed and voted upon at three of these conferences. The idea was favourably received.

The work carried on by the Women's Institute is but the beginning of greater things, for when the women of the rural districts awaken to their own power, with the splendid machinery provided by the institute constitution, there will be no social problem that cannot be handled effectively.

Respectfully submitted.

V. S. MACLACHLAN,
Secretary, B.C. Women's Institutes.

REPORT OF GENERAL ASSISTANT ON EXHIBITION-WORK, VICTORIA.

A. H. SHOTBOLT.

Dr. D. Warnock, F.R.C.V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my annual report on the above work for the year 1920.

Vancouver Fair was held from September 11th to 18th in the Horticultural Building. The Provincial display consisted of vegetables, fruit, minerals, fish, and grain. Our new grain-cases were much admired. The "Riker" mounts of the different pests to be found in grasses, vegetables, and fruit attracted great attention, whilst the transparencies of our British Columbia fruit valleys made good advertising for this important industry. Pamphlets on poultry, live stock, pests, and pruning were placed for general distribution, there being a great demand for pamphlets on potato diseases and pests. The weather was very unfavourable, but the attendance was fair.

Victoria Fair was held from September 20th to 25th in the Agricultural Building at the Willows. This was the first exhibition held there since the war and proved a great success. Our display was transferred from Vancouver to the Willows. The attendance was large.

New Westminster Fair was held from September 27th to October 2nd. Our display was transferred from Victoria to New Westminster and we had a much better display of fruit in Westminster than at the earlier fairs, owing to the fact we could obtain riper fruit at that time than we could earlier. The weather was good and the attendance was very large.

The British Columbia Dairymen's Association Convention was held in Victoria at the Empress Hotel from February 7th to 9th, at which an exhibit was displayed to show the food value of milk. This proved such an attraction to both grown-ups and children that it was decided to extend the time two days longer.

Respectfully submitted.

A. H. SHOTBOLT.

APPENDICES.

APPENDIX No. 1.

TOTAL CORRESPONDENCE RECEIVED AND DISPATCHED BY THE DEPARTMENT OF AGRICULTURE (AT VICTORIA) FOR THE YEARS ENDING DECEMBER 31ST, 1919 AND 1920.

	Received.		Dispatched.	
	1920.	1919.	1920.	1919.
Office of the Deputy Minister—				
General	8,850	6,459	6,193	4,123
Farmers' Institutes	1,412	1,563	1,181	1,534
Women's Institutes	909	784	361	652
Agricultural Associations	461	527	583	839
Secretary, Women's Institutes	715	422	908	399
Dairy Branch	1,157	2,113	1,736	2,505
Horticultural Branch	2,173	1,158	2,249	1,440
Live Stock Branch—				
General	4,128	6,247	6,013	6,974
Brands	2,420	.....	2,902	.....
Poultry Division	1,857	1,926	3,295	3,023
Soil and Crop Division	294	340	641	517
Publications Branch	1,714	1,739	2,226	1,117
Statistics Branch	1,960	620	1,364	525
Totals	28,050	23,898	29,652	23,648

APPENDIX No. 2.

SUMMARY OF APPROPRIATIONS VOTED FOR DEPARTMENT OF AGRICULTURE.

	Fiscal Year 1918–19.	Fiscal Year 1919–20.	Fiscal Year 1920–21.
General—			
Salaries of staff officials	$ 78,184 00	$ 87,344 00	$135,656 00
Administration, travelling expenses, and miscellaneous	70,000 00	61,490 00	86,030 00
Agricultural Associations	16,000 00	35,000 00	35,000 00
Bee-keeping—			
Grant and compensation, etc.	250 00	1,500 00	1,250 00
Exhibition and publicity work	500 00	2,000 00	3,000 00
Horticulture—			
Control of fruit pests and diseases; B.C.F.G.A. grant; inspection of imported fruit; Markets Branch	13,250 00	23,750 00	24,300 00
Institutes, Farmers' and Women's	16,000 00	18,000 00	16,000 00
Live stock—			
Various grants	5,500 00	7,750 00	8,000 00
Compensation for T.B.	20,000 00	33,500 00	30,000 00
Noxious weeds	.....	1,000 00	1,000 00
Seed-growing	.....	.....	2,500 00
Totals	$219,684 00	$271,334 00	$342,736 00

APPENDIX No. 3.

WOMEN'S INSTITUTE FLOWER-SHOWS, EXHIBITIONS, ETC., YEAR 1920.

Date.	Institute.	Occasion.
June 8	Rutland	Health exhibit; "babies" clinic.
„ 17	Upper Sumas	Flower-show; exhibition of school-children's work.
„ 19	South Saanich	„ „ „ „
„ 23	Lake Hill	„ „ „ „
„ 24	Hatzic	„ „ „ „
„ 24	Strawberry Vale	Exhibition of school-children's work.
„ 29	Langford	„ „ „
July 7	Chilliwack	Flower-show.
„ 8	Hazelmere	Rose-show; exhibition of school-children's work.
„ 8	Parksville	Flower-show.
„ 10	Willow Point	„
„ 10	Agassiz	„
„ 14	Haney	„ [children's work.
„ 14	Colwood	Flower-show; "better baby" clinic; exhibition of school-
„ 21	Matsqui	Flower-show; exhibition of women's work.
„ 28	Nakusp	Flower-show.
Aug. 4	Langley Fort	„
„ 4	Surrey	Flower-show; "better babies," etc.
„ 18	West Summerland	Flower-show; exhibition of women's work; "better babies"
„ 18	Summerland	Flower-show. [clinic.
„ 19	Salmon River Valley	Flower-show; exhibition of women's work and school-children's
„ 19	Mission City	Flower-show; "better babies" clinic. [work.
„ 20	Tappen	Flower-show.
„ 20	Central Park	Flower-show; exhibition of women's work and school-children's
„ 21	Crawford Bay	Flower-show; exhibition of school-children's work. [work.
„ 23	North Saanich	„ „ „ „
„ 23	Ladysmith	Flower-show; exhibition of women's work and school-children's
„ 25	Tynehead	Flower-show; exhibition of women's work. [work.
„ 25	Kalamalka	Exhibition of school-children's work.
„ 26	Kaslo	Flower-show.
	Penticton	Flower-show; "better babies" clinic.
Sept. 1	Burquitlam	Flower-show; exhibition of women's work.
„ 6	Harrop and District	Flower-show; exhibition of women's work and school-children's
„ 8	Strawberry Vale	Exhibition of school-children's work; flower-show. [work.
„ 8	Garden City	Flower-show; exhibition of women's work and school-children's
„ 15	Matsqui	Exhibits. [work.
„ 15	Strawberry Hill	Flower-show.
„ 16	Cranbrook	Flower-show; exhibition of women's work and school-children's
„ 17	Sooke	Flower-show. [work.
„ 21-23	Armstrong	Flower-show; exhibition of women's work and school-children's
„ 17-18	Duncan	Exhibition of women's work. [work.
„ 28-29	New Denver	Flower-show. [work.
	Naramata	Flower-show; exhibition of women's work and school-children's
	Vernon	Flower-show; exhibition of women's work and school-children's
„ 25	Rock Creek	Flower-show. [work.
„ 28-30	Kootenay Valley	Exhibits of women's work at Nelson Fair.

APPENDIX No. 4.

Cost of Operation of certain Official Automobiles, Department of Agriculture.

Name of Official.	Mileage run.	Cost of			Total Cost.	Cost per Mile in Cents.
		Tires.	Gasolene and Oil.	Spare Parts Repairs, etc.		
Anderson, T. M. (Kelowna)	4,848	$ 85 49	$ 205 00	$ 93 05	$ 383 54	7.9
Barlow, C. R. (Salmon Arm)	5,461	41 06	196 12	223 09	460 27	8.4
Evans, H. H. (Vernon)	4,829	23 50	143 75	71 40	238 65	4.9
Evans, H. H. (Vernon), old car	5,764	135 23	177 12	138 21	460 56	7.8
Fleming, W. M. (Duncan)	3,407	40 95	138 36	62 45	241 76	7.1
Hay, Geo. C. (Kamloops)	8,254	79 47	263 25	336 66	679 38	8.2
Mann, A. J. (Penticton)	4,185	22 35	167 49	106 45	296 29	7.0
Newton, W. (Victoria)	4,063	22 40	142 13	73 45	237 98	5.8
Phelps, C. (Quilchena)	2,870	43 15	194 39	68 80	306 34	10.7
Robertson, W. H. (Victoria)	5,971	73 10	163 30	177 53	413 93	6.9
Tait, John (Summerland)	6,620	54 80	211 35	116 59	382 74	5.7
Tice, Cecil (Victoria)	4,864	26 15	176 87	114 82	317 84	5.2
Totals	61,136	$647 65	$2,179 13	$1,582 50	$4,409 28	7.21

APPENDIX No. 5.

Grants to Agricultural Associations, etc., holding Fairs, Year ending December 31st, 1920.

Abbotsford-Sumas Agricultural Association	$ 165 00
Agassiz Agricultural and Horticultural Association	171 00
Alberni Agricultural and Industrial Association	88 00
Aldergrove Agricultural Association	93 00
Armstrong and Spallumcheen Agricultural Association	925 00
Arrow Lakes Agricultural and Industrial Association	114 00
British Columbia Agricultural and Industrial Association (Victoria)	5,000 00
Bulkley Valley Agricultural and Industrial Association	500 00
Burquitlam Agricultural Association	150 00
Chilliwack Agricultural Association	990 00
Cobble Hill and District Agricultural Association	42 00
Comox Agricultural and Industrial Association	300 00
Coquitlam Agricultural Society	168 00
Cowichan Agricultural Society	783 00
Creston Valley Agricultural Association	159 00
Delta Agricultural Society	281 00
Elk Valley and Natal Agricultural Society	136 00
Fruitvale Agricultural Association	60 00
Golden Agricultural Society	250 00
Islands Agricultural and Fruit-growers' Association	83 00
Kamloops Agricultural Association	735 00
Kamloops District Stock-breeders' Association	400 00
Kelowna Agricultural and Horticultural Society	391 00
Ladysmith Agricultural Society	177 00
Langley Agricultural Association	330 00
Maple Ridge Agricultural Association	368 00
Matsqui Agricultural and Horticultural Association	186 00
Mission Agricultural Association	263 00
Nanoose Agricultural Association	80 00
Nelson Agricultural and Industrial Association	355 00
North and South Saanich Agricultural Society	300 00
North Vancouver Horticultural Society	86 00
Carried forward	$14,129 00

APPENDIX No. 5—*Continued.*

GRANTS TO AGRICULTURAL ASSOCIATIONS, ETC., HOLDING FAIRS—*Continued.*

Brought forward	$14,129 00
Northern British Columbia Agricultural and Industrial Association	500 00
Penticton Agricultural and Horticultural Association	410 00
Pritchard Agricultural Association	128 00
Richmond Agricultural and Industrial Society	300 00
Royal Agricultural and Industrial Society (New Westminster)	8,304 00
Salmon Arm and Shuswap Lake Fall Fair	400 00
Slocan Lake Agricultural Association	132 00
Slocan Valley Agricultural and Industrial Association	150 00
The District of Surrey Agricultural Association	248 00
Trail Fruit Fair Association	393 00
Windermere District Agricultural Society	223 00
Forest Grove Farmers' Institute	50 00
Howe Sound Farmers' Institute	25 00
Kitsumgallum Farmers' Institute	100 00
Windermere District Association of Stock-breeders (Winter Fair)	250 00
Vancouver Exhibition Association	6,356 00
Total	$32,098 00

APPENDIX No. 6.

FRASER VALLEY BERRY ACREAGE. (COMPILED 1920.)

District.	Growers.	Raspberries.			Blackberries.			Loganberries.			Strawberries.		
		1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.
Mission-Hatzic	250	205⅝	91¼	286⅛	34	25½	59⅞	29¼	16¾	16½	211½	149½	86¾
Pitt Meadows-Hammond-Haney	248	87⅛	25⅞	58⅛	27¾	13¼	22⅜	¾	¾	1¼	246⅜	143⅝	72¼
Whonnock-Ruskin	30	12⅛	1	3¾	2¾	½	¾	...	...	⅛	55	18	3
Chilliwack-Sardis	50	15¼	4⅞	6½	1¾	9¼	5⅛	21½	10½	2½	63⅜	10⅝	4¾
Mount Lehman-Strawberry Hill	50	16⅜	12	17⅛	½	...	...	1	...	...	45 5/6	7 5/6	2¾
Burnaby Lake	24	6⅜	3¼	15½	...	...	1⅛	1	...	¾	10½	11½	4¼
Totals	652	343¼	138¼	387⅛	66¾	48½	89¼	53½	28	21⅛	632 3/6	341½	173¾
		858⅝			204½			102⅝			1,147⅜		

District.	Growers.	Red Currants.			Black Currants.			Gooseberries.			Rhubarb.		
		1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.
Mission-Hatzic	250	6⅝	6	3⅜	18¼	9½	16¼	12	6½	15⅜	36¾	5¾	40¾
Pitt Meadows-Hammond-Haney	248	⅜	⅛	⅛	1⅞	¼	⅝	⅝	⅝	⅛	...	¼	¼
Whonnock-Ruskin	30	⅜	...	...	¼	...	...	½	...	...	...	...	...
Chilliwack-Sardis	50	2¼	...	⅜	1¼	2⅛	1	1	2	¼	...	...	...
Mount Lehman-Strawberry Hill	50	...	...	...	...	...	⅛	...	...	½	...	...	...
Burnaby Lake	24	...	...	...	...	...	1	...	...	¼	...	...	2
Totals	652	9⅛	6⅛	3⅞	21⅝	11⅞	19	13⅞	9⅛	16½	36¾	6	43
		19½			52½			39½			85¾		

Total acreage, 2,520⅜.

APPENDIX No. 7.

Berry Acreage, Salmon Arm District (66 Growers). (Compiled 1920.)

Raspberries.			Blackberries.			Loganberries.			Strawberries.			Gooseberries.			Black Currants.			Rhubarb.		
1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.	1920.	1919.	Pre.
9	..	22	¼	½	1¼	1	½	12¾	3¼	7¾	8¾	..	..	2¼	..	..	5/6	1	..	..

APPENDIX No. 8.

Results of Spraying Experiments at Salmon Arm, 1920.

Plot.	Date applied.	Clean.	Scabbed.	Boxes per Tree.	Remarks.
1	L.S. 1–30; May 15th; 1–35, June 4th; 1–35, June 30th	99.10	0.90	6	Early infection.
2	L.S. 1–39, May 15th; 1–35, June 4th; 1–35, June 30th; 1–60, July 23rd	99.12	0.88	6½	„
3	L.S. 1–35, May 15th; 1–40, June 4th; 1–45, June 30th	98.86	1.14	6	„
4	L.S. 1–40, May 15th; 1–45, June 4th; 1–45, June 30th	98.85	1.15	4	„
5	L.S. 1–40, May 15th; 1–50, June 4th; 1–50, June 30th	99.10	0.90	6½	..
6	S.W.D.L.S. 3–45 May 15th; 2–45, June 4th; 2–45, June 30th	93.20	6.80	6½	..
7	Check	54.18	45.82	3	Infection of all ages.
8	Home-made L.S. 1–30, May 15th; 1–35, June 4th; 1–35, June 30th	98.92	1.08	7	Early infection.

Note.—The home-made L.S. used on Plot 8 tested 28° Baumé, and allowance was made accordingly in dilution.

APPENDIX No. 9.

Memorandum of Imported Fruit, Potatoes, Corn, etc., inspected at all Ports of Entry in British Columbia (including those condemned).

	1919.	1920.
Apples (boxes)	24,710	87,411
„ (½ boxes)	450	209
„ (bbls.)	8	10
Crab-apples (boxes)	70	43
Pears (boxes)	32,076	24,802
„ (½ boxes)	51	17
„ (¾ boxes)	.....	3,368
Yakamines (boxes)	.....	156
Plums (boxes)	10,965	10,892
Prunes (boxes)	3,290	6,492
Peaches (boxes)	60,107	54,716
Apricots (boxes)	26,176	15,401
Nectarines (boxes)	16	.....
Quince (boxes)	47	30
Cherries (boxes)	8,140	6,387
California oranges (boxes)	130,382	133,393
Japanese oranges (boxes)	319,777	235,432
„ „ „ (shipped out)	181,636	113,117

APPENDIX No. 9—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA—*Continued.*

	1919.	1920.
Chinese oranges (boxes)	364	275
Tangerines (boxes)	5	.....
Lemons (boxes)	23,601	30,553
Grapefruit (boxes)	10,987	18,602
Limes (boxes)	.....	1
Pineapples (boxes)	816	55
Pomeloes (boxes)	79	406
Persimmons (boxes)	269	430
Pomegranates (boxes)	248	302
Tomatoes (boxes)	5,955	17,432
Peppers (boxes)	1,072	2,296
Egg-plants (boxes)	152	194
Potatoes (tons)	3,838	9,812
„ (crates)	2,132	.....
Sweet potatoes (tons)	.....	350
„ (crates)	5,262	.....
Yams (tons)	.....	61
„ (crates)	940	.....
Taro (tons)	.....	113
„ (crates)	1,800	.....
Mango (crates)	2	.....
Onions (crates)	.....	2,400
Rice (tons)	15,211	22,913
Corn (tons)	5,719	11,265
Beans (tons)	12,885	4,986
Peas (tons)	3,275	784
Peanuts (tons)	.....	1,819
Walnuts (tons)	.....	313

APPENDIX No. 10.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1919.	1920.
Apples (boxes)	2,804	2,736
„ (½ boxes)	46	20
Crab-apples (boxes)	1	10
Pears (boxes)	2,613	897
Plums (boxes)	92	116
Peaches (boxes)	1,490	2,592
Apricots (boxes)	227	.....
Cherries (boxes)	166	12
California oranges (boxes)	670	1,324
Grapefruit (boxes)	41	45
Pineapples (boxes)	.....	10
Tomatoes (boxes)	30	173
Potatoes (tons)	113	186
Sweet potatoes (crates)	355	1
Onions (crates)	.....	257
Peas (lb.)	.....	1
Corn (tons)	.....	40
Walnuts (lb.)	.....	11,375

APPENDIX No. 11.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., CONDEMNED AT VANCOUVER.

	1920.
Walnuts (lb.)	11,375

APPENDIX No. 12.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, ETC., INSPECTED AT VICTORIA.

	1919.	1920.
Rice (tons)	3,282	6,350
Corn (tons)	1,529	2,563
Beans (tons)	70	32
Peas (tons)	1	1
Peanuts (tons)	.....	6
Walnuts (lb.)	.....	100
Of which the following were fumigated:—		
Rice (tons)	1,010	150
Corn (tons)	75	15
Peanuts (tons)	.....	2
Cherry-boxes	1,466	.....
Oilcake (tons)	.....	86
Rice-mats.		

APPENDIX No. 13.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., INSPECTED AT VANCOUVER (INCLUDING THOSE CONDEMNED).

	1919.	1920.
Apples (boxes)	19,976	75,643
„ (½ boxes)	206	79
„ (barrels)	.....	2
Crab-apples (boxes)	2	10
Pears (boxes)	30,220	23,722
„ (½ boxes)	50	17
„ (¾ boxes)	.....	3,368
Plums (boxes)	8,222	7,894
Prunes (boxes)	2,921	5,930
Peaches (boxes)	36,160	40,303
Cherries (boxes)	6,264	4,821
Apricots (boxes)	22,097	13,949
Yakamines (boxes)	.....	86
Quince (boxes)	42	23
California oranges (boxes)	94,550	100,218
Japanese oranges (boxes)	291,745	211,175
„ „ „ (shipped out)	181,636	113,117
Chinese oranges (boxes)	364	275
Tangerines (boxes)	5	.....
Lemons (boxes)	18,151	23,095
Grapefruit (boxes)	9,060	15,578
Pomeloes (boxes)	.....	124
Limes (boxes)	.....	1
Pineapples (boxes)	561	40

APPENDIX No. 13—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., INSPECTED AT VANCOUVER—*Continued.*

	1919.	1920.
Persimmons (boxes)	230	349
Pomegranates (boxes)	173	244
Tomatoes (boxes)	4,092	15,693
Peppers (boxes)	411	1,374
Egg-plants (boxes)	72	155
Potatoes (crates)	98	.....
„ (tons)	3,577	7,778
Sweet potatoes (crates)	3,745	5,741
Yams (crates)	794	936
Taro (crates)	1,717	2,006
Mango (crates)	2	.....
Onions (crates)	.....	1,200

APPENDIX No. 14.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT VANCOUVER.

	1919.	1920.
Apples (boxes)	2,334	1,785
„ (½ boxes)	45	.....
Crab-apples (boxes)	1	10
Pears (boxes)	2,533	894
Plums (boxes)	92	101
Peaches (boxes)	153	20
Cherries (boxes)	166	12
Apricots (boxes)	95	.....
California oranges (boxes)	670	.....
Tomatoes (boxes)	4	168
Potatoes (tons)	110	177.672
Sweet potatoes (boxes)	353	.....
„ (crates)	.....	1
Onions (crates)	.....	257

APPENDIX No. 15.

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER.

Standard fruit-trees—	1919.	1920.
Apple	25,968	44,094
Crab-apple	465	210
Pear	9,605	13,649
Cherry	6,478	8,009
Plum	3,652	3,022
Prune	4,669	5,346
Peach	4,703	7,885
Quince	153	160
Nectarine	53	33
Apricot	10,489	4,261
Fig	5	8
Mulberry	59	.....

APPENDIX No. 15—*Continued.*

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER—*Continued.*

	1919.	1920.
Nut-trees—		
Walnut	277	609
Filbert	48	31
Chestnut	11	29
Almond	14	39
Seedlings, grafts, and scions—		
Fruit seedlings	238,769	298,549
Ornamental seedlings	.....	4,483
Grafts	66,270	192
Scions	.....	4,300
Small-fruit bushes and plants—		
Grape-vines	1,409	6,020
Currant-bushes	2,944	13,676
Gooseberry-bushes	6,776	4,080
Raspberry and loganberry	13,956	172,010
Blackberry	16,452	8,931
Strawberry-plants	97,246	855,750
Strawberry-plants inspected at Nelson	78,100	.....
Miscellaneous—		
Ornamental trees, etc.	20,739	30,264
Rose-bushes	34,969	21,593
Ornamental grafts	87	.....
Plants (herbaceous)	26,289	26,503
Roots and bulbs	375,807	1,150,266
Totals	1,046,462	2,684,002

APPENDIX No. 16.

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER.

Standard fruit-trees—	1919.	1920.
Apple	246	3,458
Crab-apple	22	42
Pear	272	1,059
Cherry	169	119
Plum	42	210
Prune	13	262
Peach	1,026	1,456
Quince	3	.....
Nectarine	2	.....
Apricot	249	99
Nut-trees—		
Filbert	2	2
Walnut	.....	2
Chestnut	.....	12
Seedlings and grafts—		
Fruit seedlings	604	1,591
Ornamental seedlings	.....	100
Grafts	1,947	12

APPENDIX No. 16—*Continued.*

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER—*Continued.*

	1919.	1920.
Small-fruit bushes and plants—		
Grape-vines	86	1,181
Currant-bushes	61	149
Gooseberry-bushes	18	188
Raspberry and loganberry	83	643
Blackberry	223	239
Strawberry	.....	8,775
Miscellaneous—		
Ornamental trees, etc.	168	338
Rose-bushes	197	58
Plants (herbaceous)	.....	162
Roots and bulbs	2,509	26,488
Totals	7,942	46,645

APPENDIX No. 17.

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED.

	1919. Crates.	1920. Crates.
Artichokes	71	79
Asparagus	1,250	2,699
Beets	7	580
Green beans	64	93
Brussels sprouts	116	263
Cabbage	2,612	15,178
Cauliflower	3,180	4,564
Celery	493	1,963
Cucumbers	1,032	632
Carrots	3,839	1,132
Corn (10 condemned)	55	62
Garlic	73	1,043
Lettuce	7,783	12,837
Lentils	.....	3,500
Nutmegs	.....	36
Onions	10,282	27,168
Olives	.....	10
Peppers	.....	3
Potatoes	.....	791
Pumpkins	.....	2
Parsley	135	196
Parsnips	.....	25
Green peas	195	947
Radishes	158	418
Rhubarb	2,347	2,084
Seed (miscellaneous)	3,024	714,600
Squash	385	358
Sue Choy	.....	582
Sugar-cane	.....	63
Spinach	67	1,349
Turnips	12	855
Bak Choy	.....	50
Burdock-root	.....	2,300

APPENDIX No. 17—*Continued.*

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED —*Continued.*

	1919. Crates.	1920. Crates.
Bulbs and roots	.....	1,005
Vegetables	42	26
Leeks	.....	33
Mint	.....	50
Horse-radish	11	.....
Cantaloupes	11,733	17,512
Casabas	3,050	6,191
Melons	7,110	5,134
Watermelons	58,672	26,954
Apples (dried)	.....	188
Bananas (bunches)	49,622	47,649
Blackberry	.....	1
Blueberry	.....	20
Dates	.....	12
Foo Gwah	.....	6
Figs	.....	145
Cranberries	367	1,818
Gy Choy	.....	5
Ginger-root	.....	2,000
Grapes (31 condemned)	34,301	18,402
Gooseberries	26	21
Ky Choy	.....	2
Loganberries	10	.....
Raspberries	35	.....
Strawberries	10,931	5,287
Almonds	8,710	3,319
Butternuts	.....	50
Brazil nuts	4,282	6,596
Chestnuts	207	10,500
Cocoanuts	142	1,907
Cocoa-beans	.....	182,990
Chicory	.....	2
Copra-cake	.....	36,800
Filberts	.....	1,332
Peanuts	11,388	2,033,500
Walnuts (black)	.....	50
Water-chestnuts	.....	2,400
White nuts	.....	2,300
Walnuts	14,147	301,791
Pecans	.....	500
Wheat	.....	247,651
Water-lily	.....	9,400
Tapioca	.....	4

APPENDIX No. 18.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER.

		1919. Tons.	1920. Tons.
267,059	50-lb. sacks rice		
270	60-lb. „		
1,000	97-lb. „		
173,990	100-lb. „		
150	104-lb. „		
200	108-lb. „	11,929	16,561
9,700	112-lb. „		
3,756	200-lb. „		
28	224-lb. „		
708	240-lb. „		
4,137	50-lb. mats rice		
2,295	50-lb. sacks beans		
40	80-lb. „		
95,962	100-lb. „	12,815	4,899
523	150-lb. „		
3	180-lb. „		
28	200-lb. „		
1	20-lb. sacks peas		
3	80-lb. „	3,274	685
5,663	100-lb. „		
4,021	200-lb. „		
22	100-lb. sacks corn		
45	150-lb. „		
7	160-lb. „	4,190	8,168
16,324,020	lb. bulk corn		
2,404	lb. popcorn		
3,622,247	lb. peanuts	....	1,811
623,174	lb. walnuts	....	311

The following were fumigated:—		Tons.	Lb.
1,786	100-lb. sacks rice	16	89 600
53	50-lb. sacks beans	3	1 1,550
9	100-lb. „		
27	200-lb. sacks peas	....	2 1,400
12	100-lb. sacks corn	810	728 1,033
70	150-lb. „		
1,445,333	lb. bulk corn		
73,500	lb. peanuts	235	36 1,500

1,300 sacks or 120 tons Australian wheat sterilized by Globe Fertilizer Co.
2 bales corn-husks (2 bales in 1919).
3,600 empty mats.
455 empty sacks (11,265 and 40 bundles in 1919).
15 tons wheat.

APPENDIX No. 19.

Dairy Premises visited, Cattle tested, and Reactors.

Place.	No. of Premises visited.	No. of Cattle tested.	Reactors.
Victoria	129	652	84
Saanich	149	774	65
Metchosin	68	265	20
Sooke	23	110	1
Cowichan	259	1,446	41
Comox	33	224	4
Ladysmith	8	38	2
Nanaimo	25	60	6
Alberni	3	8	..
Denman Island	5	10	..
Sidney Island	1	74	16
Saltspring Island	112	474	3
Mayne Island	19	94	1
Galiano	11	51	..
Valdes	21	56	1
Malcolm Island	52	123	..
Sayward	8	33	7
Vancouver	90	262	39
Westminster	41	352	11
Cloverdale	46	419	19
Sea Isle	28	634	54
Ladner	31	315	29
Deroche	23	299	3
Burnaby	22	76	2
Bowen Isle	7	15	..
Coquitlam	8	83	22
Chilliwack	345	3,964	89
Agassiz	14	92	5
Lulu Isle	118	1,044	61
Surrey	60	544	14
Barnston Isle	9	107	3
Langley	163	1,236	15
Matsqui	65	762	21
Mission	3	32	2
Dewdney	40	600	21
Sumas	9	112	1
Yale	5	9	1
Abbotsford	4	6	..
Pemberton Meadows	1	9	1
Pitt Meadows	23	199	13
Prince Rupert	2	59	2
Anyox	1	10	1
Prince George	1	3	..
Telkwa	2	13	1
Ootsa Lake	1	7	..
Glen Valley	1	7	..
Hammond	3	11	..
Haney	16	80	28
Hatzic	1	1	..
Kamloops	4	128	..
North Bend	9	36	1
Whonnock	1	2	2
Squamish	20	87	2

APPENDIX No. 20.

CATTLE TESTED FOR TUBERCULOSIS.

Place.	No. visited.	No. tested.	Rec.	Killed	No. of Premises.	Remarks.
Armstrong	..	153	..	..	34	3 (actinomycosis).
Aspen Grove	1	7	..	..	1	
Cameron Point	1	1	..	..	1	
Crawford Bay	1	..	..	..	3	
Athalmer	1	23	..	..	6	
Deer Park	1	2	1	1	3	Actinomycosis.
Enderby	1	4	..	..	2	
Erickson	1	2	..	..	1	
Fernie	1	..	..	..	2	Sanitary inspection.
Grand Forks	1	104	1	1	33	
Grindrod	1	21	..	..	4	
Glen Rosa	3	12	..	..	5	
Golden	1	47	..	..	12	
Heffley Creek	1	6	..	..	1	
Invermere	2	31	..	..	14	
Kelowna	3	1	1	1	3	2 (contagious abortion).
Kamloops	1	31	..	..	2	
Kettle Valley	1	6	..	..	1	
Keefers	1	..	..	..	1	Inspection.
Lumby	1	..	..	..	5	"
Nakusp	2	140	5	5	53	
North Kamloops	2	1	1	1	2	
Notch Hill	1	..	..	..	1	Post-mortem.
Oyama	4	14	..	..	3	
Okanagan Landing	2	13	..	..	3	
Osoyoos	1	25	1	1	2	
Princeton	2	105	2	2	11	
Pritchard	1	9	1	1	3	
Penticton	3	53	..	..	17	
Peachland	1	3	..	..	2	
Rutland	2	5	1	1	3	
Rossland	1	1	1	1	1	
Rock Creek	1	1	1	1	1	
Revelstoke	2	64	1	1	5	
Red Lake	1	6	..	..	2	
Similkameen	1	1	..	..	1	
Shuswap Falls	1	13	..	..	2	
Salmon Arm	1	2	..	..	1	
Salmon River	1	13	..	..	6	
Summerland	1	3	..	..	2	
Tranquille	1	..	..	..	1	Inspection.
Wynndel	1	3	..	..	2	
Windermere	1	2	..	..	1	
Wilmer	1	14	..	..	3	
Vernon	3	22	1	1	4	
Totals	62	964	18	18	266	

In a few districts there is some improvement in the sanitary conditions, but in most places there is little, if any, improvement. The chief reason is the cost of lumber and hardware.

APPENDIX No. 21.

List of Creameries, Condenseries, and Cheese-factories in British Columbia.

Name.	Manager or Secretary.	Post-office Address.
Burns, P., & Co.	M. R. Silver	Woodland Drive, Vancouver.
" "	G. J. Swanson	Vernon.
Comox Creamery Association	R. U. Hurford	Courtenay.
Cowichan Creamery Association	W. Paterson	Duncan.
Clayburn Creamery	Cooper & Seldon	Clayburn.
Curlew Creamery Co.	H. Henderson	Grand Forks.
" "	H. Tenne	Nelson.
Fraser Valley Milk Producers' Association	E. Sherwood	703 Rogers Bldg, Vancouver.
" " "	W. K. McLeod	Chilliwack.
Fraser Valley Dairy	E. G. Sherwood	1170 Hornby Street, Vancouver.
Fraser Valley Dairies, Ltd.	G. O. Clark	405 Eighth Ave. W., Vancouver.
Heffley Creek Creamery	Thos. Bunting	Heffley Creek.
Kamloops District Creamery Association		Kamloops.
Kelowna Creamery Co., Ltd.	W. G. Benson	Kelowna.
Meadowbrook Creamery Co.	A. P. Slade	199 Water Street, Vancouver.
Nanaimo Creamery Association	Jos. Randle	Nanaimo.
Nechako Valley Co-operative Creamery Association	G. H. Outram	Vanderhoof.
Northwestern Creamery, Ltd.	Norton & Snelling	1131 Broad Street, Victoria.
Northern Okanagan Creamery Association	E. G. Archibald	Armstrong.
New Westminster Creamery Society, Ltd.	G. W. Grimston	442 Front Street, New Westminster.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.
Royal Dairy Co.	W. C. McAllister	Victoria.
Saltspring Island Creamery Association	A. W. Drake	Ganges.
Salmon Arm Creamery Association	R. Karnagel	Salmon Arm.
Spencer, David, Ltd.	D. W. Matheson	Vancouver.
Vancouver Creamery Co., Ltd.	J. M. Livingstone	15–23 Alexander St., Vancouver
Vancouver Island Milk Producers' Association	R. Waterhouse	930 North Park St., Victoria.
Vernon Creamery	H. W. Knight	Vernon.
Condenseries.		
The Borden Milk Co., Ltd.	L. Chevalley	Sardis.
The Pacific Milk Co., Ltd.	John R. Payne	Ladner.
" " "	"	Abbotsford.
Cheese-factories.		
Fraser Valley Milk Producers' Association		Sardis.
" " "		Clayburn.
Ferrara Cheese Manufacturing Co.	A. G. Ferrara	Chilliwack.
Revelstoke Creamery Co., Ltd.	J. L. Carman	Revelstoke.

APPENDIX No. 22.

List of Ice-cream Manufacturers in British Columbia.

Name.	Address.
Almonds, Ltd.	400 Pender Street East, Vancouver.
City Dairy Co.	New Westminster.
F. S. Clarke	Nanaimo.
Comox Creamery Association	Courtenay.
Curlew Creamery Co.	Grand Forks.
" "	Nelson.
Fraser Valley Dairy	1170 Hornby Street, Vancouver.
Kelowna Creamery Co., Ltd.	Kelowna.
J. E. McKenzie	Nanaimo.
Westminster Ice and Creamery Co.	New Westminster.
Northern Okanagan Creamery Association	Armstrong.
Northwestern Creamery, Ltd.	Broad Street, Victoria.
Royal Dairy	1001 Pender Street, Vancouver.
"	Douglas Street, Victoria.

APPENDIX No. 22—*Continued.*

LIST OF ICE-CREAM MANUFACTURERS IN BRITISH COLUMBIA—*Continued.*

Name.	Address.
David Spencer, Ltd.	Hastings Street West, Vancouver.
W. S. Terry	Fort Street, Victoria.
Victoria City Dairy Co., Ltd.	1111 Fort Street, Victoria.
White Lunch, Ltd.	124 Hastings Street West, Vancouver.
Crescent Ice Cream Co.	1002 Hastings Street West, Vancouver.

APPENDIX No. 23.

CREAMERY OR DAIRY LICENCES ISSUED UNDER "CREAMERIES AND DAIRIES REGULATION ACT" FOR THE YEAR 1920.

Name.	Address.
Almonds, Ltd.	400 Pender Street, Vancouver.
Borden Milk Co., Ltd.	Sardis.
Burns, P., & Co., Ltd.	Woodland Drive, Vancouver.
" "	Vernon.
City Dairy & Produce Co., Ltd.	Sixth Avenue and Sixth Street, New Westminster.
" " "	414 Pender Street East, Vancouver.
Clayburn Creamery	Clayburn.
Comox Creamery Association	Courtenay.
Cowichan Creamery Association	Duncan.
" "	930 North Park Street, Victoria.
Curlew Creamery Co.	Grand Forks.
" "	Nelson.
East End Dairy	2469 Oxford Street, Vancouver.
Ferrara Cheese Co., Ltd	Chilliwack.
Fraser Valley Milk Producers' Association	"
" " "	Clayburn.
" " "	Sardis.
Fraser Valley Dairy	1170 Hornby Street, Vancouver.
Fraser Valley Milk Producers' Association	1327 Standard Bank Building, Vancouver.
Fraser Valley Dairies, Ltd.	405 Eighth Avenue West, Vancouver.
Heffley Creek Creamery	Heffley Creek.
Kamloops District Creamery Association	Kamloops.
Kelowna Creamery Co., Ltd.	Kelowna.
Knight, H. W.	Vernon Creamery, Vernon.
Maple Leaf Dairy Co.	Nanaimo.
Meadowbrook Creamery	199 Water Street, Vancouver.
Nanaimo Creamery Association	Nanaimo.
Nechako Valley Co-operative Creamery Assn.	Vanderhoof.
New Westminster Creamery Society, Ltd.	New Westminster.
Northern Okanagan Creamery Association	Armstrong.
Northwestern Creamery, Ltd.	1311 Broad Street, Victoria.
North Vancouver Dairy	133 Fifth Street East, North Vancouver.
Pacific Milk Co., Ltd.	332 Drake Street, Vancouver.
" "	Courtenay.
Price & Green	905 Twenty-fourth Avenue East, Vancouver.
Revelstoke Creamery Co., Ltd.	Revelstoke.
Royal Dairy Co.	1001 Pender Street West, Vancouver.
" "	Douglas Street, Victoria.
Salmon Arm Creamery Association	Salmon Arm.
Saltspring Island Creamery Association	Ganges.
Spencer, David, Ltd.	Hastings Street West, Vancouver.

APPENDIX No. 23—*Continued.*

Creamery or Dairy Licences issued—*Continued.*

Name.	Address.
Steves, J. M., Dairy Co.	2144 Twelfth Avenue West, Vancouver.
Valley Dairy, Ltd.	1569 Sixth Avenue West, Vancouver.
Vancouver Creamery, Ltd.	15–23 Alexander Street, Vancouver.
Vancouver Island Milk Producers' Association	930 North Park Street, Victoria.
Victoria City Dairy	1111 Fort Street, Victoria.
White Lunch, Ltd.	124 Hastings Street West, Vancouver.

APPENDIX No. 24.

Testers' Licences issued under "Creameries and Dairies Regulation Act" for the Year 1920.

Name.	Address.
Bates, H. F.	Sardis.
Batey, H. S.	1170 Hornby Street, Vancouver.
Brooks, F.	1938 Second Avenue West, Vancouver.
Bunting, Thos.	Heffley Creek.
Burmeister, J.	Sixth Avenue and Sixth Street, New Westminster.
Calder, Jas.	882 Hamilton Street, Vancouver.
Carman, J. E.	Revelstoke.
Carroll, W. J.	Courtenay.
Carter, Jas. N.	Seventeenth Avenue and Ontario Street, Vancouver.
Chevalley, F.	Sardis.
Clark, F. J.	850 Fourteenth Avenue West, Vancouver.
Clegg, Wm.	1145 Robson Street, Vancouver.
Craig, J.	930 North Park Street, Victoria.
Drake, A. W.	Ganges.
Dunn, J. S.	Nanaimo.
Egerton, W.	R.M.D. 4, Victoria.
Emery, E. G.	Abbotsford.
George, H. H. S.	Kamloops.
Hall, F. D. B.	Chilliwack.
Hansen, H. M.	Matsqui.
Hooper, W. J.	1001 Pender Street West, Vancouver.
Iwanami, J.	1111 Fort Street, Victoria.
James, D. A.	Courtenay.
Jenne, H. H.	Nelson.
Jenne, R. E.	Grand Forks.
Johnson, Alfred	Vernon.
Karnagel, R.	Salmon Arm.
Kell, Geo.	New Westminster.
LeBlanc, R.	Nanaimo.
Lewarne, A. E.	400 Pender Street East, Vancouver.
Lewarne, A.	1569 Sixth Avenue West, Vancouver.
Livingstone, J. B.	3241 St. George Street, Vancouver.
Livingstone, J. M.	23 Alexander Street, Vancouver.
Magar, J. A.	Sardis.
Matheson, D. W.	Care D. Spencer, Vancouver.
MacLeod, W. K.	Chilliwack.
Mackenzie, H. H.	New Westminster.
McAllister, C. W.	Douglas Street, Victoria.
Menzies, Thos. A.	Sandwick.
Metcalfe, J. F.	3436 Oak Street, Vancouver.
Munn, J. A.	Sardis.
Naud, D.	930 North Park Street, Victoria.
Nelson, C. E.	2144 Twelfth Avenue West, Vancouver.

APPENDIX No. 24—*Continued.*

TESTERS' LICENCES ISSUED—*Continued.*

Name.	Address.
Norton, F. H. A.	1311 Broad Street, Victoria.
Richardson, D. H.	489 Tenth Avenue, New Westminster.
Ringwood, J. G. T.	Ganges.
Rive, Chas.	2226 Twelfth Avenue West, Vancouver.
Rive, Elias	2226 Twelfth Avenue West, Vancouver.
Russell, Geo. F.	110 Maple Avenue, Powell River.
Sejrup, V. M.	Duncan.
Sellers, J. H.	414 Pender Street East, Vancouver.
Sherwood, E. G.	703 Rogers Building, Vancouver.
Silver, Mark R.	2215 Powell Street, Vancouver.
Smith, Geo.	Nelson.
Swanson, G. F.	Vernon.
Thomas, S. J.	Kelowna.
Thornbery, G. H.	Vancouver.
Turnbull, Miss M.	Kelowna.
Valentin, M.	Vanderhoof.
Washington, F. J.	Vancouver.
Watson, J. B.	Sardis.
Wells, B.	Ladner.
Wozencroft, E. G.	Eburne.
Young, E.	Vancouver.

APPENDIX No. 25.

COW-TESTING ASSOCIATIONS IN BRITISH COLUMBIA.

Name.	Instituted.	Secretary.	Tester.	Departmental Grant.
Chilliwack	March 17, 1913	Wm. Dusterhoeft, Chilliwack	J. A. Munn	$600 00
Comox	April 23, 1914	John Pritchard, Comox	T. A. Menzies	600 00
Langley-Surrey	June 8, 1914	H. Berry, Langley Prairie	Wm. Egerton	600 00
Delta	April 12, 1915	W. N. Townsend, Ladner	G. H. Candy	100 00
Richmond	March, 1919	G. E. C. Hooper, Eburne	E. G. Wozencroft, M. MacGougan, G. C. Newland	480 00
Dewdney	Aug. 30, 1919	Thos. Brearley, Dewdney	A. S. Rankin	490 00
Kelowna-Vernon	April, 1920	M. S. Middleton, Vernon	W. Thomson, E. Young, C. Rive	675 00
Testing Centres.				
Edgewood	July, 1920	E. J. Bangs, Edgewood	F. Gibson	9 66
Courtenay	October, 1920	F. Field, G.W.V.A., Courtenay	Captain Griffin	10 34

AVERAGE YIELDS IN DIFFERENT ASSOCIATIONS SINCE 1915.

Name.	1915.		1916.		1917.		1918.		1919.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Chilliwack	7,152	297.6	7,693	314.5	7,482	303.4	6,487	266.7	6,674	278.0
Comox	4,950	231.3	5,044	229.7	5,958	280.7	6,193	303.6	5,766	280.4
Langley-Surrey	6,553	241.6	6,847	267.7	6,798	258.4	6,660	252.5	7,294	270.2
Delta	....	....	6,448	247.9	6,805	269.4	7,866	296.4	7,861	277.1

APPENDIX No. 26.

Estimated Honey-crop, 1920.

Territory.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Vancouver Island and Gulf Islands.				
Comox	54	216	2,160	10
Duncan	77	308	3,000	10
Gulf Islands	50	175	1,750	10
Howe Sound	32	64	600	10
Nanaimo	104	400	4,000	10
Victoria	189	570	6,000	10
Totals	506	1,733	17,510	10
Bulkley Valley.				
Bulkley Valley	5	7	570	80
Greater Vancouver.				
Burnaby	84	505	5,050	10
Coquitlam	19	119	1,000	9
Kerrisdale	20	60	360	6
South Vancouver	67	314	2,100	7
Marpole	19	56	330	6
North Vancouver	60	300	600	2
Point Grey	16	55	250	5
New Westminster	28	130	1,040	8
Vancouver	81	267	2,140	8
Totals	394	1,806	12,870	7
Lower Fraser.				
Delta	68	408	6,120	15
Maple Ridge	55	330	13,200	40
Richmond	48	240	3,600	15
Surrey	95	668	22,945	34
Langley	64	300	7,260	24
Matsqui	82	645	21,325	33
Totals	412	2,591	74,450	29
Upper Fraser and Chilliwack.				
Chilliwack	86	350	3,500	10
Kent	20	90	900	10
Dewdney	20	130	4,550	35
Mission	55	260	5,200	20
Sumas	59	410	8,200	20
Totals	240	1,240	22,350	18
Okanagan.				
Okanagan	180	1,080	51,300	46
Thompson River	61	270	16,200	60
Totals	241	1,350	67,500	50
Kootenays.				
Slocan Valley	24	88	4,440	50
Kootenay Lake and West Arm	34	84	1,920	23
Nelson	46	123	4,895	40
Arrow Lakes	30	250	7,585	30
Castlegar	7	57	1,695	30
East Kootenay	10	43	1,145	26
Boundary	12	276	6,470	23
Creston	25	89	2,310	26
Totals	188	1,010	30,460	30

APPENDIX No. 26—*Continued.*

ESTIMATED HONEY-CROP—*Continued.*

Summary.

Territory.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Vancouver Island and Gulf Islands	506	1,733	17,510	10
Bulkley Valley	5	7	570	80
Greater Vancouver	394	1,806	12,870	7
Lower Fraser	412	2,591	74,450	29
Upper Fraser and Chilliwack	240	1,240	22,350	18
Okanagan	241	1,350	67,500	50
Kootenays	188	1,010	30,460	30
Totals	1,986	9,737	225,710	23

Average wholesale price for 1920 crop, 30 cents per pound; total amount, $67,713.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Provincial Museum of Natural History for the year 1920.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office,

Victoria, February, 1921.

PROVINCIAL MUSEUM OF NATURAL HISTORY,

VICTORIA, B.C., February 24th, 1921.

The Honourable J. D. MacLean, M.D.,

Provincial Secretary, Victoria, B.C.

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ending December 31st, 1920, covering the activities of the Museum.

I have the honour to be,

Sir,

Your obedient servant,

F. KERMODE,

Director.

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REPORT *of the*

PROVINCIAL MUSEUM OF NATURAL HISTORY

FOR THE YEAR 1920.

OBJECTS.

(*a.*) To secure and preserve specimens illustrating the natural history of the Province.

(*b.*) To collect anthropological material relating to the aboriginal races of the Province.

(*c.*) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and diffuse knowledge regarding the same.

ADMISSION.

The Provincial Museum is open, free, to the public daily throughout the year from 9 a.m. to 5 p.m. (except New Year's Day, Good Friday, and Christmas Day); it is also open on Sunday afternoons from 1 p.m. to 5 p.m. from May 1st until the end of October.

VISITORS.

The number of visitors who have signed the register of the Provincial Museum during the year 1920 is 25,850. These figures are by no means accurate, as this only includes one person to a line, although many signatures on one line include man, wife, and family. Many other people visiting the Museum do not seem to like the idea of recording their names, and no record has been kept of the children, and also of school classes who are accompanied by their teachers in connection with their nature-studies. If a turnstyle were to be installed we would then be able to record the actual number of attendance daily in the museum. The following figures will give some idea of those who recorded their names during the months of: January, 1,093; February, 1,289; March, 1,348; April, 1,603; May, 1,839; June, 2,287; July, 4,538; August, 5,607; September, 2,838; October, 1,367; November, 1,028; December, 1,023.

ACTIVITIES.

There have been added eighteen ornithological storage (moth-proof) cases to take care of the study series of bird-skins which are stored in the annex, also two walnut, plate-glass exhibition cases for the entomological section.

The Public Works Department has begun excavating the basement in the Provincial Museum, and when this is completed all the valuable study material, ornithological, anthropological, and mammals, which are stored in the wooden annex at the rear, will be removed and placed in the basement, which will be practically free from danger of fire and from probable loss in other ways.

Many applications have been made from teachers throughout the Province for scientific literature to assist them in teaching nature-studies to their pupils. It has been impossible for the Director to supply the same; the only literature we have on hand are the Annual Reports, in which the scientific research-work is noted throughout the year.

During the year the Herbarium has been greatly enriched by a large number of specimens added, which were mentioned in last year's report in the botanical section.

By an agreement between the Director of this Department and Mr. R. G. McConnell, Deputy Minister of the Geological Survey, Ottawa, the collection of Cryptograms made by Professor John Macoun were to be taken over by this Department for storage and safe-keeping, and a division of the same was to be made between the Geological Survey and the Provincial Museum. The division of these specimens has now been completed, and the collection of the Provincial Museum has been enriched by over 4,000 specimens which were collected by Professor John Macoun and named by himself and other authorities. These specimens have now been catalogued and added to the collection, the balance having been turned over to the Geological Survey, Ottawa.

The manuscript for the Check-list of the Flora of Vancouver Island is being completed and it is hoped to have it in the printer's hands within the next few weeks. In this work we have been greatly assisted by the late Professor Macoun and his son, the late J. M. Macoun.

IN MEMORIAM.

Professor John Macoun, one of the oldest members of the Ottawa Field Naturalists' Club, died at Sidney, Vancouver Island, B.C., on July 18th, 1920, in his ninetieth year. He was born at Maralin, Ireland, about 20 miles from Belfast, on April 17th, 1831. He came to Canada in 1850.

In 1872 Mr. Macoun accompanied Sir Sanford Fleming as Botanist on an expedition to the West to explore and determine the line for the first transcontinental railway, now known as the Canadian Pacific.

In 1875 Mr. Macoun was appointed Botanist to an expedition in the Peace River country under the leadership of the late Dr. Alfred Selwyn, then Director of the Geological Survey, Ottawa, and in 1881 was appointed Botanist to the Dominion Government, although he had, at intervals, been doing work for the Government since 1872.

Perhaps the strongest trait in Professor Macoun's character was a sympathetic understanding of his fellow-men, one that made him hosts of friends and a much-sought adviser in questions of doubt and difficulty. The honesty of his opinion and the straightforwardness with which his advice was given, in conjunction with his sympathetic manner of giving it, secured for him a respect and affection that lasted a lifetime. His wonderful magnetism and ready tact constituted him a leader of men, and had his great abilities turned to statesmanship he would have been a great power for the good of his country. He was a true Imperialist and a firm believer in the strength and integrity of the British Empire.

He had many strong and outstanding personal characteristics. His determination and perseverance are marked through all his early explorations, and many accounts might be related where it was nothing but sheer determination that carried him safely through perilous and exhaustive situations.

The late Professor Macoun was the highest authority on botanical research in Canada. His loss will be keenly felt not only by the Department in Ottawa with which he had been so long connected, but also by the Provincial Museum in Victoria, to which he was a constant contributor and visitor.

ACCESSIONS.

Leg-bones of humpbacked whale taken at Kyuquot Station and presented to the Provincial Museum by Mr. W. Lawson, Vice-President of the Consolidated Whaling Corporation, Victoria, in January, 1920.

Log of wood, Douglas Fir (*Pseudotsuga mucronata*), showing portion of tree which had been cut into many years ago and how Nature provides for the covering of the hewn part. Presented by Mr. E. W. Haskell, Red Gap, B.C., March, 1920.

Collection of Fungi, Musci, Lichens, Hepaticæ, and Algæ. Collected and presented by Professor John Macoun, Sidney, B.C., April, 1920.

Plants collected and presented by: Dr. C. F. Newcombe, W. B. Anderson, W. R. Carter, W. A. Newcombe, J. G. French, Victoria, B.C.; Professor J. K. Henry, Vancouver, B.C.; and Miss Susan Beaman, Prince Rupert, B.C.

Fork-tailed Gull (*Xema sabinei*), taken at Glacier Point, Sooke, B.C., and presented by Mr. J. G. French, October, 1920.

Log of wood containing larva of Long-horned Beetle (*Prionus californicus*). Presented by Mr. C. R. Pooley, Cobble Hill, January, 1921.

Two specimens of White-winged or Iceland Gull (*Larus leucopterus*), collected by Mr. William McKay, Kildonan, V.I., January and February, 1921.

PUBLICATIONS OF OTHER INSTITUTIONS.

(Alphabetically arranged.)

American Museum of Natural History, New York City	1
Art Institute of Chicago, Illinois	7
Alpine Club Journal, Banff, Alberta	1
Archæological Society of Ontario, Toronto, Ont.	1
British Museum, London, England	6
Carried forward	16

PUBLICATIONS OF OTHER INSTITUTIONS—*Continued.*

Brought forward	16
Brooklyn Institute of Arts and Sciences, Brooklyn, N.Y.	1
Bureau of Science, Manilla, P.I.	2
California Academy of Sciences, San Francisco, Cal.	11
California University, Berkeley, Cal.	9
Carnegie Museum, Pittsburgh, Pa.	2
Charleston Museum, Charleston, S.C.	6
Children's Museum of Boston, Boston, Mass.	2
City Art Museum, St. Louis, Mo.	6
Colorado Museum of Natural History, Denver, Col.	1
Dominion Government Publications, Ottawa	19
Detroit Institute of Arts, Detroit, Mich.	9
Field Museum, Chicago, Ill.	5
Grand Rapids Public Library, Grand Rapids, Mich.	2
Illinois State Natural History Survey, Urbana, Ill.	6
Library of Congress, Washington, D.C.	1
Louisiana State Museum, New Orleans, La.	2
Manchester Museum, England	2
Manx Museum, Isle of Man	1
Milwaukee Public Museum, Wisconsin	1
Minneapolis Institute of Arts, Minn.	9
Minnesota University, Minn.	1
Museum of Fine Arts, Boston, Mass.	8
Nebraska University, Lincoln, Neb.	4
New York Botanical Garden, N.Y.	2
Ohio Agricultural Experimental Station, Wooster, Ohio	15
Peabody Museum, Salem, Mass.	1
Peabody Museum, Yale University, New Haven, Conn.	10
Pennsylvania Museum and University	5
Philadelphia Academy of Natural Sciences, Pa.	2
Roger Williams Park Museum, Providence, R.I.	7
Smithsonian Institution, Washington, D.C.	34
Staten Island Institute, New Brighton, N.Y.	6
Sydney Museum, Australia	1
United States Department of Agriculture, Washington, D.C.	2
University of Washington, Seattle, Wash.	1
Wagner Free Institute of Science, Philadelphia, Pa.	1
Zoological Society, New York, N.Y.	2
Zoological Society, Philadelphia, Pa.	1
Total	216

The thanks of the Department are extended to the contributors, also to others who have assisted in the securing of collections and identifications of specimens, namely: Dr. C. F. Newcombe, Victoria, B.C.; Professor J. K. Henry, Vancouver, B.C.; W. B. Anderson, Victoria, B.C.; E. W. Nelson, Chief Biological Survey, Washington, D.C., and staff.

Also to the following scientists, whose names are alphabetically arranged, for the determination of entomological specimens: Drs. W. Barnes and A. W. Lindsey, Decatur, Ill.; Mr. August Busck, Washington, D.C.; Dr. H. G. Dyar, Washington, D.C.; Dr. J. H. McDunnough, Ottawa, Ont.; Dr. R. Ottolengui, New York, N.Y.; Dr. H. Skinner, Philadelphia, Pa; Mr. L. W. Swett, Lexington, Mass.

BOUNTIES OF WOLVES.

According to the Orders in Council passed under the "Game Protection Act," all applications for bounties on wolves must be sent to the Director of the Provincial Museum for verification.

It is interesting to note that for the year 1920 the Government was only called upon to pay the bounty on 124 wolves, the bounty on which was $15 per head. It will be noticed that most

of these applications have come from the Northern Coast and Northern Interior of the Province, very few applications for bounties being made south of the main line of the Canadian Pacific Railway, and I have no record of any applications being made on a wolf that was killed on Vancouver Island during the year.

The following is a list of the persons to whom bounties were paid during the year 1920:—

C. B. Cole, Teslin Lake	17
C. L. Irvine, Teslin Lake	13
I. Director, Prince Rupert	13
A. J. Phillipson, Prince Rupert	12
R. Boyd Young, Port Simpson	12
Hudson's Bay Company (various localities)	10
R. Williams, Corridon Bay	8
A. C. Christenson, Bella Coola	3
R. Wilson, Prince Rupert	3
W. Goldbloom, Prince Rupert	2
Stephen Cook, Alert Bay	2
Walter Scott, Simoon Sound	2
A. Enockson, Prince Rupert	2
J. E. Ornheim, Prince Rupert	2
W. Flanagan, Rivers Inlet	2
J. L. Nygaard, Bella Coola	2
G. A. Kelly, Blondin Harbour	2
Charles Kilbourne, Simoon Sound	1
A. Anderson, Sointula	1
Mose King, Simoon Sound	1
Herbert Wait, Swanson Bay	1
A. Farquharson, Harbledown Island	1
Barnett Dopp, Fort St. John	1
J. Eklund, Prince Rupert	1
Albert Michand, Terrace	1
F. Knowles, Hartley Bay	1
W. Purl, Port Simpson	1
H. Roberts, Vancouver	1
A. Muchlbaner, Atlin	1
D. Johnson, Swanson Bay	1
L. J. Lewis, Marpole	1
Charles Bibeau, Stewart	1
J. Rogers, Prince Rupert	1
P. Brozart, Prince Rupert	1
Total	124

Several coyotes have been turned in with the timber-wolves by persons making applications for bounty; these, however, have been identified as coyotes, and bounty refused unless the pelts were turned in to the Government to receive the Government bounty, which is only $2 on this animal.

MAMMALS.

NOTES ON THE OCCURRENCE OF A HUMPBACKED WHALE HAVING HIND LEGS.

On January 8th, 1920, the Director took up with Mr. W. Lawson, the Vice-President of the Consolidated Whaling Corporation, Limited, Victoria, B.C., the notes which had appeared in the press in reference to a humpbacked whale having been taken at Kyuquot Station, on the west coast of Vancouver Island, which had leg-bones attached to the lower extremities of the body; this being noted by the Director as a most unusual occurrence; in fact, the first record known of any of these large animals having such an extraordinary growth.

Mr. Lawson presented these bones to the Provincial Museum. The Director received the following data from Mr. S. C. Ruck, who for a number of years was Managing Director of the

Consolidated Whaling Corporation, Limited, but now of the Vancouver Island Whaling Company, which will be of special interest, and is here copied:—

"I enclose herewith three photographs showing the unusual development of the pelvic rudiments in a whale captured at the Kyuquot Station last July, of which you have the bones. It is to be regretted that better pictures in evidence of this unprecedented development were not obtained.

"I have been connected with the whaling industry for twenty-two years, and during my time have come in contact with prominent naturalists, such as Professor True, of the Smithsonian Institution; Professor Lucas, of the Natural History Museum, Brooklyn; and Professor Andrews, of the Natural History Museum, New York; and neither in their experience nor mine have the protrusion of the pelvic bones beyond the body ever been seen or heard of.

"This particular whale was a female humpback of the average length, with elementary legs protruding from the body about 4 feet 2 inches, covered with blubber about ½ inch thick.

"As shown in the best photograph, these legs protruded on either side of the genital opening; the left leg was cut off by the crew of the vessel and lost, and the point at which it was cut off is clearly shown in the photograph. The end of the leg seen in the picture terminated in a kind of round knob like a man's clenched fist.

"The two bones of the leg which you have are connected by cartilage, which I was informed had shrunk about 10 inches, and possibly more by this time. At any rate, the total length of the leg before it was cleaned of the blubber and flesh was, as before stated, about 4 feet 2 inches from the body.

"S. C. Ruck."

Later, Mr. Roy Chapman Andrews, Assistant Curator of Mammals of the American Museum of Natural History, New York, who had done a tremendous amount of work monographing the whales of the world, heard of these most unusual appendages, and writing the Director of the Provincial Museum, asked for information regarding the same. These specimens were loaned to Mr. Andrews, who is preparing a paper on the same. Extracts from his letters no doubt will be of great interest, and are as follows:—

August 2nd, 1920. "The special excuse for this letter is to ask about some so-called exterior limb bones which were discovered on a humpback whale taken on the west coast of Vancouver Island. My friend, Mr. Sidney Ruck, of the Whaling Company, told me that one of the legs was sent to the Museum, and I shall be interested to know if you have it there; also, what the thing is like. Are there actual bones or is it only tissue and blubber? I am very much interested in the subject, and if you can give me any information I will be very grateful.

"Roy Chapman Andrews."

September 20th, 1920. "When I returned from my vacation two days ago I found the whale-bones which you sent awaiting me. I am tremendously interested in them, for they represent a phase in evolution of which I have never seen any evidence in all the whales which I have investigated, and I should greatly like to publish a short paper on the bones, and want to ask whether or not you have any objections to my doing so. Will you not let me know as soon as possible about it, for I want to take up the matter of its preparation immediately if you are willing.

"Roy Chapman Andrews."

October 7th, 1920. "Many thanks for your letter of September 27th, giving me permission to publish a paper on the external leg-bones of the humpback whale which you so kindly loaned for our inspection. I will, of course, be glad to acknowledge our indebtedness to Mr. Lawson and Mr. Ruck, and will have a number of separates sent to you.

"Roy Chapman Andrews."

Insectivorous Mammals, Family Soricidæ.

Distribution of Species occurring in British Columbia.

Shrews, or shrew-mice, as they are often named from their mouse-like form, belong to the true Insectivores. So like are these animals to mice and rats that they are often erroneously confused with them, although they are easily distinguishable by their long pointed snouts, their rounded ears closely pressed to the sides of the head, and the characteristics of the first pair

of front incisor teeth; those of the upper jaw being long and generally sickle-shaped, with a more or less distinct cusp at the base of their hinder border, while in the lower jaw they are long and project horizontally forwards, in some instances curving upward at the tips, and, with the exception of perhaps one African species, have only six teeth on each side of the lower jaw.

With the exception of a few species which have taken to an aquatic life, the shrews are terrestrial and nocturnal in their habits. Shrews have a wider distribution than any other family of the Insectivores and comprise a far larger number of species.

Until quite recent years there appears to have been a diversified opinion in the nomenclature applied to many of our shrews.

In 1895 three papers by C. Hart Merriam and Gerrit S. Miller, Jr., were published by the United States Department of Agriculture (Division of Ornithology and Mammalogy) in the "North American Fauna," No. 10, revising the shrews of the American genera *Blarina* and *Notiosorex;* the long-tailed shrews of the Eastern United States; and a general synopsis of the American shrews of the genus *Sorex*. From this revision we are able to some extent to classify the shrews occurring within our limits.

From a perusal of these papers it is proposed here to briefly outline the earlier-known history of our shrews, which may be acceptable to some of our readers interested in the study of our smaller mammals.

For a long period the short-tailed shrews of the genera *Blarina* and *Notiosorex*, which so far as we know do not occur within our limits, were included in the genus *Sorex*, and were first separated by Gray in 1838 under the name of *Blarina* proposed as a subgenus; in 1842 *Blarina* was raised to full generic rank by Lesson; Baird in 1857 divided the genus *Blarina* in two sections according to the number of teeth, and Coues in 1877 recognized and named these sections as subgenera, *Blarina* proper with thirty-two teeth and *Soriciscus* with thirty; the reduction being in the unicuspids, of which there are five in *Blarina* proper, as in true *Sorex*, and only four in *Soriciscus*. The lost tooth in the latter subgenus is the second premolar.

The first short-tailed shrews known to naturalists were two specimens secured by Mr. Say, naturalist to Major Long's expedition to the Rocky Mountains in Eastern Nebraska, a few miles north of the present City of Omaha. These two specimens curiously became the types of the largest and smallest species of the genus *Blarina*, and later of the two subgenera into which the genus was split, collected during the winter of 1819–20 and described by Mr. Say in 1823, the larger as *Sorex brevicaudus*, the smaller as *Sorex parvus*.

Long-tailed Shrews of the Genus Sorex.

The first account of an American marsh-shrew was published in 1828, when Richardson described *Sorex palustris*, an animal he had found frequenting the borders of lakes in the region between Hudson Bay and the Rocky Mountains. In 1857 Baird placed *Sorex palustris* among the species unknown to him, but which he considered as probably worthy of recognition, at the same time describing the new genus *Neosorex* and the species *Neosorex navigator* from Washington.

Our first accurate knowledge of *Sorex palustris* dates from 1890, when Dr. Dobson figured the teeth of the type specimen, and in another paper published the same year discussed the validity of the genus *Neosorex*, coming to the conclusion that *Sorex palustris* and *Neosorex navigator* are the same, and that *Neosorex*, so far from being a genus, cannot even be recognized as a subgenus; a year later Dr. Merriam recorded *Sorex palustris* from Idaho, at the same time remarking that he considered *Neosorex* a very good subgenus.

The type specimen of *Sorex palustris* is in the British Museum; while its condition is such as to furnish no evidence, it was deemed necessary to judge the old descriptions on their own merits, and as all the early accounts of *Sorex palustris* refer to its pale, ash-grey belly, and as the geographical range, indefinite though it is, coincides with that of the Western animal, it is proper to apply the name to the latter.

That the type of *Sorex palustris* is a *Neosorex* and not an *Atophyrax* is shown by the teeth, which are nearly unworn; *Neosorex* is confined to North America, and, although not closely related to the Old World *Crossopus*, shows a remarkable comparison with the latter, both in habits and external appearance, both being aquatic, inhabiting marshes and the borders of streams.

All American shrews have two pelages commonly known as winter and summer coats, and, as is usual among small mammals, the moult takes place at different dates among individuals

of the same species, and it is not uncommon to take specimens in different pelages on the same day in the same locality. The winter pelage is usually plumbeous, dusky or ash grey; the summer pelage, sepia brown or chestnut. In defining the various species, identification has been largely based on cranial and dental characters, such as the size and form of the brain-case, breadth of palate, length and degree of attenuation of the rostrum, and the breadth of the interorbital construction, while size and depth of emargination of the molariform teeth and the proportion of the unicuspidate teeth are the chief factors of dentition.

Comparatively little field-work has been done in British Columbia collecting our smaller mammals, many areas being untouched, where further research may furnish new material and in some instances would undoubtedly extend the geographic distribution known to us at the present time.

The following species occur within our limits:—

Sorex personatus Geoffroy St. Hilaire. Type locality, Eastern United States (exact locality unknown). Distributed throughout the Boreal and Transition Zones of North America from New England to Alaska. Specimens identified from Glacier; Field; Cariboo Lake; Sicamous; Mount Baker Range.

Sorex sphagnicola Coues. Type locality, vicinity of Fort Laird, B.C., about latitude 60. Geographic distribution, sub-arctic America from extreme Northern British Columbia (and probably Alaska) to Hudson Bay.

Sorex setosus Elliot. Type locality, Happy Lake, Clallam County, Olympic Mountains, Washington. Two specimens in the collection of the Provincial Museum from Khutze Inlet, B.C., recently identified, are placed here.

Sorex vagrans Baird. Type locality, Shoalwater Bay, Washington. Range, Southern British Columbia, Western Washington and Oregon, and Northern California (south on the coast to Monterey and in the mountains to old Fort Crook and Cassel). Restricted to Lower Boreal and Upper Transition Zones. Specimens identified from Port Moody; Sumas; Mount Baker Range; Okanagan.

Sorex vancouverensis Merriam. Type from Goldstream, Vancouver Island, B.C. General characters similar to *S. vagrans*, but larger, with decidedly larger fore feet and much darker coloration. Range, so far as we know, confined to Vancouver Island, where specimens from Victoria and Sahtlam, Parksville, Errington, and Alberni are identified as this species.

Sorex obscurus Merriam. Type locality, Timber Creek, Salmon River Mountains, Idaho; altitude, 8,200 feet. Geographic distribution, British Columbia and mountains of Western Washington; Idaho; Montana; Wyoming; Utah and Colorado; south along the high Sierra Nevada in California to Mount Whitney. Restricted to Boreal Zone. Specimens identified from Nelson; Ward; Field; Glacier; Golden; Cariboo Lake; Sicamous; Sumas; Port Moody; also Goldstream and Comox, on Vancouver Island.

Sorex obscurus longicauda Merriam. Type from Wrangell, South-east Alaska. *Sorex obscurus* is a strictly boreal species and in the United States it is exclusively a mountain animal, not descending to base-level until British Columbia is reached. In the Puget Sound region, however, and along the coast of Washington and thence northerly to Alaska it sends a representative all the way down to sea-level. This representative is larger, has developed an exceedingly long tail, and has taken on certain peculiarities of coloration, being described by Merriam as a subspecies, in the belief that intergradation with *obscurus* takes place. Three specimens examined from Port Moody, British Columbia, are more or less intermediate between *S. longicauda* and *S. obscurus*.

Sorex longicauda elassodon Osgood (Queen Charlotte Shrew). Type from Cumshewa Inlet, Moresby Island, Queen Charlotte Islands, British Columbia collected June 13th, 1900, by W. H. Osgood and E. Heller. Specimens taken at Cumshewa; Skidegate; Masset.

Sorex longicauda prevostensis Osgood (Prevost Island Shrew). Type from Prevost Island, Queen Charlotte Islands, British Columbia; collected July 3rd, 1900, by W. H. Osgood and E. Heller. Range, only known from Prevost Island, Q.C.I., and differing from the shrews of Graham and Moresby Islands to a greater degree than from the Mainland species *S. longicauda*.

Sorex trowbridgi Baird. Type locality, Astoria, Oregon. Ranges throughout Western Washington and Oregon, west of the Cascade Range. Museum specimens taken at Sumas are identified as this species.

Sorex palustris navigator (Neosorex) Baird. Type locality unknown, stated to be Fort Vancouver, Washington, but probably northern Idaho. Geographic distribution, the Rocky Mountains and outlying ranges from British Columbia to Southern Colorado and the Sierra Nevada of California, south to the Sequoia National Park. Specimens identified from Nelson; Cranbrook; Lillooet; Atlin; Lake District, near Victoria, Vancouver Island.

Sorex bendirii (Atophyrax) Merriam. Type, Klamath Basin, Oregon. Range, Klamath Basin, Oregon, northward along east side of Cascade Range to Puget Sound, westward to coast of California and south to Sonoma County. Museum specimens taken at Sumas are referred to this species.

A number of small mammal-skins were sent to Mr. Edward Nelson, Chief, Biological Survey, Department of Agriculture, Washington, D.C., early in the year for identification, and these, having been identified by members of his staff, were returned in April. The identifications of the *Sorex* and *Neosorex* have been made by Dr. Jackson, who is engaged on a critical study of these groups, and the *Peromyscus* by Mr. Howell and Mr. Preble.

The following is the list of mammals sent and identified:—

Peromyscus.

(Catalogue No. of Skins with Corresponding Skulls.)

297. *Peromyscus maniculatus borealis.*
298. *Peromyscus maniculatus borealis.*
299. *Peromyscus maniculatus borealis.*
304. *Peromyscus maniculatus borealis.*
305. *Peromyscus maniculatus borealis.*
308. *Peromyscus maniculatus borealis.*
409. *Peromyscus maniculatus artemisiæ.*
411. *Peromyscus maniculatus artemisiæ.*
452. *Peromyscus maniculatus artemisiæ.*
453. *Peromyscus maniculatus artemisiæ.*
454. *Peromyscus maniculatus artemisiæ.*
457. *Peromyscus maniculatus oreas.*

Sorex.

(Catalogue No. of Skins with Corresponding Skulls.)

922. *Sorex v. vagrans.*
923. *Sorex o. obscurus.*
924. *Sorex o. obscurus.*
925. *Sorex p. personatus.*
926. *Sorex v. vagrans.*
931. *Sorex v. obscurus.*
932. *Sorex v. obscurus.*
934. *Sorex v. obscurus.*
938. *Sorex v. obscurus.*
940. *Sorex v. obscurus.*
944. *Sorex v. vagrans.*
947. *Sorex o. obscurus.*
949. *Sorex vancouverensis.*
950. *Sorex o. setosus.*
952. *Sorex vancouverensis.*
961. *Sorex v. vagrans.*
962. *Sorex v. vagrans.*
963. *Sorex v. vagrans.*
974. *Sorex v. vagrans.*

(No. of Skins with no Skulls.)

948. *Sorex o. obscurus.*
951. *Sorex o. setosus.*
957. *Sorex vancouverensis.*

Neosorex.

(Catalogue No. of Skins with Corresponding Skulls.)

977. *Neosorex p. navigator.*
978. *Neosorex p. navigator.*
979. *Neosorex p. navigator.*
980. *Neosorex p. navigator.*
981. *Neosorex p. navigator.*
982. *Neosorex p. navigator.*
983. *Neosorex p. navigator.*
984. *Neosorex p. navigator.*
985. *Neosorex p. navigator.*

SOME NOTES ON THE EARLIER-KNOWN HISTORY OF THE CHIROPTERA, WITH LIST OF THOSE SPECIES OCCURRING IN BRITISH COLUMBIA.

Of our smaller mammals no order of such magnitude with such a wide geographical distribution produces a greater field for research than the Chiroptera, inhabiting, as it does, the Eastern and Western Hemispheres to the northern and southern limits of tree-growth, extending in the Pacific Ocean from America to Hawaii and the Galapagos Islands, and from Asia to New Zealand, Samoa, the Caroline and Ladrone Islands.

Bats are distinguished from all other mammals by possessing the power of true flight like that of birds, their fore-limbs being specially modified for this purpose, resulting in the order to which they belong being appropriately named Chiroptera, or hand-winged.

Certain other mammals such as the flying squirrels of genus *Sciuropterus* and the flying phalangers have a spurious flight, which is nothing more than an extension of an upward or downward leap by the aid of parachute-like expansions of the skin of the sides of the body, and cannot be extended upward beyond the limits of the impetus of the original leap.

The essential characteristic of all bats is their power of flight, and so far as we know no clue has been discovered by scientists among the extinct fauna of which we have knowledge which in any way connects them with other mammals, but it has been found that, in their essential structure, bats are so closely allied to the Insectivores, such as shrews and moles, that many naturalists express little doubt of their derivation from the ancestral forms of that order, and think it probable that the power of true flight was developed gradually from spurious flight.

Like many of our smaller mammals, classification has been based largely on dental characters, which differ very materially in the genera living on various foods.

The great majority of bats feed solely on insects and have their cheek-teeth furnished with a number of sharp cusps; the fruit-eating bats comprising the so-called flying foxes or fruit-bats of the warmer regions of the Old World, and among them the largest representatives of the order are characterized by the molars having nearly or quite smooth crowns, elongated from back to front and divided by a deep longitudinal groove; while the blood-sucking bats of South America have the front teeth specially modified for piercing the skin of animals.

The bats often locally called "leather-bats" or "flittermice," in which our particular interest is centred, inhabit the temperate regions, are insect-feeding, and belong to the family Vespertilionidæ; these bats, being dependent for their nourishment upon a full supply of insects, must in winter either migrate to warmer regions or hibernate.

To what extent some of our bats migrate appears to be imperfectly understood, but that bats migrate is an established fact; one of the earliest references made on the subject is by our great authority, Dr. Dobson, in his Catalogue of the Chiroptera in the British Museum.

It is claimed that of European species probably with one exception they hibernate, but on the American Continent we find in the "Transaction of the Royal Society of Canada," V., Section V., page 85, where Dr. C. Hart Merriam shows conclusive evidence of two of the American bats, *Lasionycteris noctivagans* and *Lasiurus cinerius*, have regular periods of migration, and Gerrit S. Miller, Jr., in his revision of the North American bats of the family Vespertilionidæ, records his observations at Highland Light, Cape Cod, Massachusetts, during the months of August and September, 1890 and 1891, where he observed the migration of the same two species together with *Lasiurus borcalis*. From these and other recorded observations it is fair to assume that the migration of bats is probably as definite as to dates and paths as that of birds.

Bats seldom feed on the ground, most species feeding and drinking on the wing. Dr. Merriam observes that "all North American bats, except when their habits have been modified by proximity to man, may be classed as cave-dwelling or tree-dwelling, according to the places in which they spend the day; as a rule the cave-dwelling species live in large colonies, while the tree-dwelling live singly or in small companies."

It is estimated by the highest authorities that little more than one-half of the living species are known to science at the present time, and it may be interesting to trace to a small extent the history and development of the classification of bats from the earliest naturalists.

Linnæus in 1758 knew seven bats, all of which he placed in *Vespertilio*, the fourth and last genus of the order Primates. In 1808, as recorded by Tiedemann, the order Chiroptera had been recognized, while with the addition of the flying lemur the genera was only seven and the species fourteen.

The real foundation for our present classification was laid by Gray in 1821, when he published the first of his many papers on bats; Gray excluded the flying lemur, recognized the two main subdivisions of the order made by Goldfuss in 1820, and applied to the names of families the system of nomenclature now in use.

In 1827 Lesson in his "Manuel de Mammalogie" once more associated the flying lemur with the bats, making the group a division of the Carnivores.

A revision of the genera of bats of the family Vespertilionidæ was made by Gray in 1838, where he abandoned his earlier plan and adopted the main divisions introduced by Spix in his "Simiarum et Vespertilionum Brasiliensium Species Novae," published in 1823.

Peters in 1865 divided the group into 10 families and subfamilies, containing 59 genera.

Dr. Dobson described 401 species, 80 genera, and 14 families and subfamilies when he published his Catalogue of the Chiroptera in the British Museum, 1878.

In 1904 Trouessart recorded 851 species, 122 genera, and 18 families and subfamilies, while Gerrit S. Miller, Jr., whose revision of the North American bats of the family Vespertilionidæ was published by the United States Department of Agriculture (Division of Biological Survey), October 16th, 1897, as "North American Fauna" No. 13, and ten years later while Assistant Curator, Division of Mammals, United States Museum, after examining the material in all the leading museums of Europe and America, wrote his work on the "Families and Genera of Bats," published as Bulletin 57 by the Smithsonian Institute, in which he concluded at that time among the known species at least 173 genera and 36 families should be recognized, being also of the opinion that probably the total number of recognized bats will eventually exceed 2,000 named forms.

The following bats occur in the Province of British Columbia:—

Corynorhinus macrotis townsendii Cooper. Type locality, Columbia River, Oregon. Geographic distribution, humid coast district of Oregon, Washington, and Southern British Columbia. Specimens identified from Comox, Vancouver Island.

Myotis lucifugus alascensis Miller. Type from Sitka, Alaska? Ranges throughout the humid coast district of Southern Alaska and Northern British Columbia. Specimens identified from Masset, Queen Charlotte Islands. A single specimen taken at Errington, Vancouver Island, August 31st, 1910, has been provisionally referred to this form by H. S. Swarth.

Myotis yumanensis saturatus Miller. Type from Hamilton, Washington. Geographic distribution, Transition Zone in Oregon, Washington, and British Columbia. Specimens identified from Shuswap; Kamloops; Kultus Lake (near Chilliwack); Mount Lehman; Port Moody; Sumas.

Myotis californicus caurinus Miller. Type from Masset, Queen Charlotte Islands, B.C. Geographic distribution, the humid coast district of British Columbia, Washington, and Oregon. Specimens identified from Port Moody and Masset, Queen Charlotte Islands.

Myotis subulatus Keenii Merriam (Keen's Bat). Type locality, Masset, Queen Charlotte Islands, B.C. Geographic distribution at present known from the type locality only. No doubt occurs throughout most of the humid north-west coast district.

Myotis evotis H. Allen (Long-eared Bat). Type locality not stated, and no type designated —possibly Monterey, California. Geographic distribution, Austral and Transition Zones from the Pacific Coast to the eastern edge of the Rocky Mountains. Specimens identified from Shuswap; Victoria.

Lasionycteris noctivagans Le Conte (Silver-haired Bat). Type locality, Eastern United States. Geographic range, North America from the Atlantic to the Pacific. Museum specimens from Okanagan and Sahtlam, Vancouver Island, are referred here. A single adult male was taken at Skidegate, Queen Charlotte Islands, B.C., on the evening of June 10th, 1900. (W. H. Osgood, "North American Fauna," No. 21.)

Vespertilio fuscus Beauvois (Brown Bat). Type locality, Philadelphia, Pa. Geographic distribution, Austral, Transition, and lower edge of Boreal Zones throughout the United States and British Provinces. Specimens identified from Ashcroft; Okanagan; Errington, Vancouver Island.

Lasiurus cinereus Beauvois (Hoary Bat). Type locality, Philadelphia, Pa. Geographic distribution, Boreal North America from Atlantic to Pacific. Museum specimens from Okanagan and Victoria, B.C.

THE LIFE-HISTORY AND DISTRIBUTION OF MARMOTS.

True marmots inhabit the northern portions of both the Old and New Worlds; in the southern portions of their range in the Old World these mammals are found only at considerable elevation above sea-level, but in more northern districts like the Siberian steppes they are found on the lowland plains.

The districts inhabited by all the Old World species, being desolate and barren, are usually subject to intense heat in summer and cold in winter.

In North America marmots are found distributed over a greater part of Canada and the United States, having a number of vernacular names by which they are commonly known in their geographic distribution.

In Eastern Canada, especially in the Province of Quebec, they are known by the name "siffleur"; in Ontario we hear of the woodchuck or ground-hog; the yellow-footed marmots of Southern British Columbia are known as woodchucks or rockchucks, while the hoary marmots of the mountains, the largest of our species, comparing favourably in size with the Alpine species of the Old World, are commonly called whistlers.

The name "siffleur," probably taking precedent, was applied to the woodchuck of Eastern Canada by Baron La Hontan in 1703.

In 1743 Catesby described the Eastern woodchuck under the name of "The Monax," while three years later Edwards published a more extended account under the title of "The Monax or Marmotte of America," his description furnishing the basis of the first technical name applied to the species—*Mus monax* Linnæus.

For the next few years the name given to the genus underwent several changes until Blumenbach in 1779 named the genus *Marmota;* however, this was upset the following year by Schreber, who introduced the name *Arctomys;* while of later date than Blumenbach's, nevertheless received general acceptance and continued in common use for the marmots until the early years of the present century, when the name *Marmota* was restored as the proper appellation of the genus. (Trouessart, E. L. Cat. Mamm. Suppl. 1904, page 343.)

The American marmots are naturally divided into three very distinct groups, as follows:—

Monax group: All the Eastern woodchucks, the Canada woodchuck, the British Columbia woodchuck, and the Ochraceous woodchuck of Alaska and Northern British Columbia.

Flaviventris group: All the yellow-footed marmots.

Caligata group: The hoary marmot of the mountains, including the species *caligata*, *olympus*, and *vancouverensis*.

Marmots, although chiefly diurnal, are sometimes nocturnal in their habits, feeding mainly on grass, succulent plants, and seeds; the Eastern species often doing considerable damage to cultivated forage-crops both by eating and trampling underfoot, and occasionally much havoc is made by their visits to kitchen-gardens. These marmots, originally living in the woods, prefer open clearings, where they are usually found in pairs or families, having their burrows under rock-piles, stone walls, stumps, roots of trees, and often in open meadows.

The yellow-footed marmots prefer rocky hillsides, in the crevices of cliffs, or under rock-piles in meadows, and are often abundant in the higher part of mountains, where they dwell more or less in colonies, their food being similar to that of the Eastern species, but probably including a greater proportion of native plants. These marmots also, when living at lower altitudes in close proximity to settlement, are exceedingly destructive to cultivated crops.

More gregarious in their habits, like all the Old World species, hoary marmots in the southern part of their range are always found about rock-slides around timber-line, but in Northern British Columbia and Alaska they are frequently found at low altitudes, often making their burrows in open meadows or grassy hillsides; while little is known of their feeding habits, it is generally conceded they feed like the other species.

They are extremely partial to fine weather, feeding during the summer months both early and late, and are extremely fond of sunning themselves on their mounds or projecting rocks where they feel safe from attack, spending a large part of their time during wet, dull, and stormy weather in their burrows. As fall approaches they become less active, often only appearing for a few hours during the hottest part of the day.

When alarmed they rush at once to the entrance of their burrows and sit up on their hind-quarters to survey the scene and detect the danger. Should the enemy approach too close a loud shrill whistle is uttered and they disappear into their burrows, reappearing after a time to see if all danger is passed. The whistling of the hoary marmot, being more pronounced, can be heard for a considerable distance; it is from this habit the name "whistler" has been applied and the name "siffleur" to the woodchuck of Eastern Canada.

Marmots usually produce from four to six at a birth, the young of the Eastern and yellow-footed species appearing about the latter part of May, while the hoary marmots probably breed somewhat later. Little information on this point is at hand. Swarth states "that in Southern Alaska young individuals of *M. c. caligata* were seen running about in the middle of June, but

on Vancouver Island during the first three weeks of July no young ones of *M. vancouverensis* had yet emerged from the burrows."

Laying up no store of food for winter use, all species of these marmots hibernate and become dormant during winter for a period of from four to six months, hibernating from the middle of September or October until the middle or latter part of March. Some of the yellow-footed species have been known to retire as early as the middle of August, when weather is genial and food abundant, the dates varying with the altitude and local condition, those individuals living in the valleys denning up earlier than those living higher up the mountains; in mild winters they occasionally appear at the mouth of their burrows in February, but re-enter their burrows and again become dormant if the temperature falls.

Of extinct and allied forms we know little. Remains of extinct species of *Susliks* occur in the higher Tertiary rocks of Europe, and the Upper Eocene beds of France produce evidence of an extinct but apparently allied genus known as *Plesispermophilus.* More primitive are the forms described as *Plesiarctomys*, which, while showing certain resemblances both to the marmots and squirrels, are found in the middle Tertiary deposits both of Europe and North America.

Species known to British Columbia.

Marmota monax canadensis (Erxleben). Type locality given as Quebec, Canada. Distribution, greater part of interior of Canada from Great Slave Lake and York Factory, south to Southern Alberta (Red Deer), Central Saskatchewan (Cumberland House), Northern Wisconsin and Michigan, Central Ontario, Southern Quebec, New Brunswick, and Nova Scotia.

"A single young specimen in very worn pelage from near the head of Finlay River, British Columbia, seems referable to *canadensis*, but with more material from this region may necessitate its reference to *ochracea*." (A. H. Howell.)

Marmota monax petrensis (British Columbia Woodchuck). Type from Revelstoke, British Columbia; collected May 12th, 1890, by W. Spreadborough. Distribution, interior ranges of Southern British Columbia and adjacent parts of United States; from Barkerville, British Columbia, south to Thompson Pass, Idaho. Specimens identified from Barkerville; Glacier; Revelstoke.

Marmota monax ochracea Swarth (Ochraceous Woodchuck). Type locality, head of 40-Mile Creek, Alaska. Distribution, interior mountain ranges of Yukon and Northern British Columbia from 40-Mile Creek south to the Babine Mountains. Specimens identified from Babine mountains; Pike River, Atlin; Takla Lake. A short series of skulls without skins from Stuart Lake is provisionally referred to this race.

Two museum specimens, Nos. 247 and 248, collected at Pike River, Atlin, July 29th, 1914, and identified as this species by Mr. A. H. Howell, Biological Survey, Washington, show two varying phases—No. 247, an immature female, being very dark blackish brown all over, with the exception of a few greyish hairs on nostrils and lower lip. Indians and whites who are well acquainted with this locality state that whole colonies of marmots of this colour have been observed by them. The other, No. 248, also an immature female, is a pale reddish cinnamon tipped with a very pale reddish buff, giving it a bicolour appearance; under-parts cinnamon rufous. With such phases occurring it is very desirable to have a large series of skins with skulls from this particular locality.

According to Mr. Howell in his revision of the genus, published in 1915, "Melanism is most strongly developed in the subspecies *Marmota caligata vigilis*, occupying the region around Glacier Bay, Alaska, and that no purely black specimens of *M. monax* have been seen, but a melanistic phase is rather common in New York and New England."

Marmota flaviventris avara Bangs (Pallid Yellow-bellied Marmot). Type locality, Okanagan, British Columbia. Distribution, interior valleys and foot-hills of Southern British Columbia and Eastern Washington and Oregon. Specimens identified from Ashcroft; Cascade; Midway; Nicola Valley; Okanagan; Penticton; Vernon.

Marmota caligata caligata (Eschscholtz) (Northern Hoary Marmot). Type locality, Bristol Bay, Alaska. Distribution, Alaska and Yukon from the Portland Canal, north on the coast to Bristol Bay, and in the interior to the Endicott Range and the mountains lying westward of Fort Good Hope, Mackenzie. Specimens identified from Bennett; Cheonee Mountains; Atlin.

Marmota caligata oxytona Hollister (Robson Hoary Marmot). Type locality, head of Moose Pass, branch of Smoky River, Alberta; altitude, 7,200 feet. Distribution, interior of Northern

British Columbia and Southern Yukon, from Teslin Lake and Laird River south to Barkerville, British Columbia, and the Mount Robson region of British Columbia and Alberta. Specimens identified from mountains near Babine; Barkerville; Finlay River; Laurier Pass; Level Mountain; McConnell Creek; Moose Pass; Moose River (North Fork); Sheslay River; Stuart Lake; Sustut Mountains; Thudade Lake.

Marmota caligata okanagana (King) (Okanagan Hoary Marmot). Type locality. Gold Range, British Columbia. Distribution, Gold and Selkirk Ranges, British Columbia, and probably main range of the Rocky Mountains in Alberta from Banff to Henry House; exact limits unknown. Specimens identified from Field; Glacier; Spillimacheen River; Toad Mountain, south of Nelson.

Marmota caligata cascadensis Howell (Cascade Hoary Marmot). Type locality, Mount Rainier, Washington; altitude, 6,000 feet. Distribution, Cascade Range at and above timberline from Mount Rainier, Washington, north to Southern British Columbia. Specimens identified from mountains near Chilliwack; Hope; Howe Sound; Mount Baker Range near United States Boundary; Skagit River; Spences Bridge; Tammi Hy Mountain.

Marmota vancouverensis Swarth (Vancouver Island Marmot). Type locality, Mount Douglas, near Alberni, Vancouver Island, British Columbia; altitude, 4,200 feet. Distribution, Vancouver Island, British Columbia. Known at present only from the mountains at the head of China Creek, some 20 miles south-east of Alberni, in the Golden Eagle Basin and King Solomon Basin and the surrounding slopes and ridges.

Howell writes in his remarks of this species: "This peculiar marmot, although clearly related to the Mainland species (*Caligata*), has, through isolation, developed striking characters, both external and cranial. The tendency of isolated coastal forms in this group to become brown (shown in a lesser degree by *M. caligata vigilis* and *M. olympus*) has reached the greatest extreme in this species, the black colours of the Mainland forms being entirely lacking and the white reduced to scattering hairs. After a season's exploration of the southern part of Vancouver Island, Swarth came to the conclusion that the species is probably confined to a small area in the vicinity of Mount Douglas." Specimens identified from Golden Eagle Basin; King Solomon Basin; Mount Douglas.

Addenda.

Omitted in the list of *Microtus* occurring within the Province published in our Annual Report of last year (1919) is:—

Microtus richardsoni arvicoloides (Rhoads) (Cascade Water-vole). Type locality, Lake Keechelus, near Snoqualmie Pass, Kittilas County, Washington; altitude, 8,000 feet. Geographic distribution, Boreal Zone of Cascade Mountains in Washington, Oregon, and Southern British Columbia. Museum specimens from Mount Baker Range.

This subspecies, the largest of our voles, appears to be hardly separable from *Microtus r. macropus* of the Boreal Zone of the Rocky Mountains. According to Vernon Bailey in his revision of the genus, a single specimen examined from Glacier, British Columbia, was fairly intermediate between *Microtus richardsoni* (De Kay) and these two southern subspecies.

ORNITHOLOGY.

As no field collecting was done by any one of the Department this year, very little ornithological material was secured; however, three species of birds of special interest can be recorded here:—

Sabine's Gull (*Xema sabini*) (Fork-tailed Gull). Although this bird had been on our list of British Columbia birds for a great many years, the specimen secured at the request of the Director by Mr. J. G. French, of Glacier Point, Sooke, B.C., on October 11th, 1920, was the first specimen to be received by the Provincial Museum. The range of this bird is Arctic Seas to Southern America. It breeds on the coast of Alaska from Kuskokwym River to Norton Sound, and in the Northern Mackenzie, Northern Keewatin, and Northern Greenland, and on the Arctic Islands of Europe and Asia; in migration on both coasts of America and casual in the Interior. Winters in Peru. Shortly after Mr. French had secured this specimen the Director and his assistant saw several in the vicinity of Victoria Harbour.

Two other specimens which are of considerable interest were collected for this Department—namely, the Iceland gull (*Larus leucopterus*)—one of which was taken in January, 1921, and the other in February, 1921. These birds were taken at Kildonan, Barkley Sound, B.C., by Mr. W. McKay.

Mr. J. W. Thompson having spoken to the Director of two gulls that had been noticed in the vicinity of Kildonan during the month of December, both pure white (and his description was so definite that they could not be mistaken for any other bird than that of the Iceland gull), the Director requested Mr. Thompson to have some person, if possible, secure these birds for this Department.

The birds are pure white throughout, about the size of the glaucous-winged gull, but having no pearl-grey mantle, being finely streaked with a very light-greyish tinge. The primaries are white throughout. Total length of the bird is about 24 inches. The feet are flesh-coloured; bill, flesh-coloured with black tip; the iris is yellow. The range of this bird, according to the A.O.U., is given as Arctic regions. Breeds from Victoria Land (Cambridge Bay) and Boothia Peninsula to Central Greenland and east to Nova Zembla; winters from Southern Greenland south to Long Island; casual on the Great Lakes; accidental in Nebraska and Maryland; in Europe south to the British Isles, Scandinavia, and Baltic Sea.

Another very peculiar-looking gull was seen by the Director and members of his staff on the lawn in front of the Parliament Buildings, Victoria, from October 13th to 25th, 1920, at intervals during these days on the arrival of the C.P.R. steamers.

This bird appeared after the arrival of one of the boats that plies on the triangular route between Victoria, Seattle, and Vancouver. It would arrive about 3 p.m. with the boat, and when the same boat was leaving at 4.30 p.m. the bird would disappear. It appeared to be following this particular boat for some time in and out of Victoria harbour. The following is a description of the gull noted by the Director:—

Back of head and nape, creamy white; bill, yellowish, bright-red spot on lower mandible like a herring-gull; well-defined collar on the neck of umber brown; throat and abdomen uniform dark brownish; wings pearly grey with black primaries and white spots. Mantle showing pearl grey intermixed with brown umber; tail, white.

NOTES ON THE CHINESE STARLING (ACRIDOTHERES CRISTATELLUS).

Many inquiries have been made from time to time in regard to a bird which is found in the heart of Vancouver City. This bird is about the size of our red-winged blackbird; is a bird that is uniform black throughout, with the exception of a dirty white spot in the primaries which is seen very distinctly in the primaries and secondaries when in flight. It has a small crest on the head; the bill is whitish horn colour; feet, yellow horn colour; iris, yellow. On the end of the tail there is a narrow band of a dirty greyish white.

The first record I have of this bird was a specimen collected by the Director in November, 1904, in the heart of Vancouver City between the old Court-house which stood on Hastings Street and the public school. My attention was first drawn to this bird by the Hon. Mr. Justice Martin. The specimen secured was at that time not known to the Director, and was sent to Washington D.C., for verification, and was identified as *Acridotheres cristatellus*, a native of Southern China, and had been reported from the Island of Luzon, in the Philippines. There were very few of these birds in Vancouver at this time, although Mr. V. W. Mitchell, of Vancouver, recently informed me that he had first noticed the bird in the year 1897, only seeing two pairs. These birds have increased considerably the last few years, and appear to make their main roost on the corner of Carrall and Cordova Streets, roosting on the sides of the buildings on ledgings under the large overhanging cornices. These roosts now contain approximately 1,200 birds. They leave their roosts in the early morning and fly off into the adjacent surroundings to fields and gardens for food. These birds are very noticeable in the afternoons about one hour before dusk, when they fly back to this roost for the night; they make a considerable noise, chattering and whistling until darkness, drawing the attention of many passers-by.

I have no record of these birds doing any harm to agricultural interests, but they should be watched and observed very closely in regard to agriculture. Mr. W. B. Anderson, Dominion Inspector of Indian Orchards, informs me he has two authentic records of these birds from persons who have observed them destroying the tent-caterpillar, which has become a considerable pest in Vancouver City.

It might be of interest here to note an extract from a Bulletin published by Richard McGregor, Ornithologist to the Bureau of Science, Manilla, where this bird had been imported to the Island of Luzon, in the Philippine Islands, many years ago, which is quoted below:—

"The next bird that will be noted even by those who are not devoted to ornithology is a slate-grey starling, *Æthiopsar cristatellus* (Linnæus), about the size of an American robin. When this bird flies a white band across the primary quills is conspicuously displayed. The feathers of the frons are long and erect or strongly antrorse, giving the head a curious profile view. The larger tail-feathers are tipped with white. For several years there was a roost of these starlings in the trees in front of the Luneta Police Station, on Bagumbayan Drive, where their chatter was very noticeable at dusk. A closely related species, *Acridotheres tristis* (Linnæus), was introduced into Hawaii, where it is well established; I found it extremely abundant on Maui Island in 1900. Both of these species are natives of Southern Asia.

"*Æthiopsar cristatellus* appears to have been introduced by the Spanish Government about 1850 with the hope that it would reduce the number of locusts, which were and still are a very serious pest to the agriculturist.

"A quotation in Blair and Robertson indicates that at least three attempts, 1849 to 1852, were made to introduce and establish a species of martin (probably one of the starlings) in the Philippines. Foreman says:—

"'In 1851 the Government imported some martins from China with the hope of exterminating the locusts. When the birds arrived in the Port of Manila they were right royally received by a body of troops. A band of music accompanied them with great ceremony to Santa Mesa, where they were set at liberty, and the public were forbidden to destroy them under severe penalties.'

"'Martin' as a Spanish word, is correctly applied to birds called 'starlings' in English, and is not equivalent to 'martin' (species of Hirundinidæ). I have been under the impression that the bird introduced into the Philippines received its local name from Juan Antonio Martinez, Governor from 1822 to 1825, but this Governor left the Philippines twenty-five years before the arrival of *pajaros martincs*. Casto de Elera gives the name *martin langostero* for *Acridotheres cristatellus*."

There is no record of any definite data as to how this Chinese starling came to be found in the vicinity of Vancouver; it is presumed that this bird was probably brought here direct from the Orient by one of the Oriental liners, and that it escaped or was liberated.

The Provincial Museum now has three specimens which have recently been collected.

BOTANY.

While no field collecting was undertaken by any of the staff of the Provincial Museum, the Herbarium collection is steadily growing, for which appreciation must be extended to Mr. W. B. Anderson, Dr. C. F. Newcombe, and others for the donation of a number of interesting specimens not hitherto in the collection.

Mr. Anderson's contributions are desirable and extensive, covering a large range of territory within the Province, including Anaham, Hazelton, and districts adjacent to Fort George, the Columbia River Valley, and Southern Okanagan.

Many of these plants have been mounted and placed in the Herbarium collection, among which are to be found the following of special interest:—

Adiantum-Capillus-Veneris L.
Pellæa occidentalis (Nels.) Rydb.
Calla palustris L.
Lilium montanum (A. Nels.).
Peramium repens Salish.
Salix sp. *fluviatilis* Nutt.
Comandra livida Richards.
Rosa Woodsii Lindl.
Astragalus tenellus Pursh.
Hedysarum boreale Nutt.
Hedysarum sulphurescens Rydb.
Oxytropis monticolor Gray.
Clarkia pulchella Pursch.
Phlox Douglasii Hook.
Castilleja lutescens (Greenman) Rydb.
Orthocarpus luteus Nutt.
Orthocarpus tenuifolius Benth.
Pentstemon pinetorum Piper.
Pentstemon Richardsonii Dougl.
Lobelia Kalmii L.
Crepis elegans Hook.
Circium sp. *foliosus* Hook.
Ratibida columnaris (Sims) D. Don.
Solidago corymbosa Nutt.
Solidago decumbens Greene.
Tetradymia canescens DC.

There are also several asters and species of Compositæ not yet determined.

Plants collected in the vicinity of Victoria and presented by Dr. C. F. Newcombe:—

Brasenia Schreberi Gmel. *Orobanche comosa* Hook.
Platyspermum scapigerum Hook. *Artemisia canadensis* Michx.
Lupinus lepidus Dougl. *Agoseris laciniata* (Gray) Greene.

Further additions are:—

Loiseleuria procumbens Desv. From the vicinity of Prince Rupert; presented by Miss Beaman.

Potentilla paradoxa Nutt. Collected at Spences Bridge, B.C., August 6th, 1920, and presented by Mr. W. A. Newcombe.

Carex Crawei Dewey. Collected at Golden, B.C., June 20th, 1920, and presented by Professor J. K. Henry.

Hydrophyllum tenuipes Heller; *Calamagrostis aleutica* Trin. Vancouver Island specimens presented by Mr. J. G. French.

Gentina propinqua Richardson. Collected at Cameron Lake, V.I., August 6th, 1916, by Mr. W. R. Carter and identified by Professor C. V. Piper, this being a new addition to the Vancouver Island flora.

Among these contributions the following appear to be new additions to the flora of British Columbia:—

Carex Crawei Dewey.

Potentilla paradoxa Nutt.

During the season a large number of plants have been identified for children attending some of the Victoria City schools and others residing in several districts of Vancouver Island. These plants were brought in by Miss M. Lawson, of the *Colonist* staff, who gave up a great deal of time and work in the interests of the children by publishing a list weekly in the Sunday edition of the *Daily Colonist.* This created a marked competition between the collectors, and, besides keeping up their individual interest, was decidedly effective as an educational lesson in nature-study by teaching them the names of some of their native flora.

Some of the plants received were in such poor condition that identification was impossible, and it is desirable, should this work be continued, that some simple methods be followed in collecting and preparing specimens which would be beneficial to all concerned.

It is worthy of mention that among the plants received were two (both introduced plants and probably garden escapes), which, so far as we know, have not been previously recorded in British Columbia, growing in a wild state, namely:—

Borago officinalis L. Collected at William Head by Miss Barbara Cox.

Nothoscordum bivalve (L.) Britton. Collected on Foul Bay Road, Victoria, by Master Jack Miller.

ENTOMOLOGY.

By E. H. BLACKMORE, F.E.S.

In my remarks in the Provincial Museum Reports for the years 1918 and 1919 special mention was made of the scarcity of insects in general and noctuids in particular, thinking that we had reached the limit in this respect, but from a collecting standpoint neither of those years was as bad as the season just past. The weather conditions were somewhat abnormal, the total rainfall for this year being 3 inches above the annual average, eight months out of the twelve being above the average precipitation; this, together with a great deal of cool weather in the early spring, made collecting conditions very unsatisfactory.

The fall collecting was also exceedingly poor, as it started to rain on September 8th and continued more or less until the end of the collecting season. Notwithstanding these drawbacks, some very interesting material was taken during the season, and it only goes to prove that if continuous and persistent collecting is carried on one can always turn up some rare and uncommon species, however unfavourable the season may be from weather conditions or other causes.

Some two or three years ago, on looking over the list of Microlepidoptera as recorded in the 1906 Check-list of British Columbia Lepidoptera, I was very much struck with the comparatively few species listed from Vancouver Island (excepting Wellington), and especially from Victoria.

Upon making a list of the localities given, I found that out of 278 species recorded from British Columbia 168 have been taken at Kaslo and 94 were listed from Wellington. The number of species recorded from other localities are as follows: Vancouver Island, 24 (no specific localities given); Victoria, 16; Vancouver, 7; and Atlin, 3. Some of the species were naturally recorded from several localities, but the large majority of species were either taken by Mr. J. W. Cockle at Kaslo or Mr. Theodore Bryant at Wellington. It is very evident from these figures that, outside of the above-named gentlemen, very little collecting of these small but interesting moths had been undertaken in any part of the Province. During the past few years, however, Messrs. Day and Hanham, of Quamichan Lake, near Duncan, have added a number of new species, and Mr. Cockle has considerably augmented his earlier list.

With the idea of extending our knowledge of the "Micro" fauna of the southern portion of Vancouver Island, the writer devoted most of his time during the past season to the acquisition of material in this group, but owing to illness was not able to get into the field until June. From then until October I made collections at Maillardville, Goldstream, Mount Newton, and many points in the vicinity of Victoria. Mr. W. R. Carter, of the Museum staff, also assisted in the work and brought in some good material. I was fortunate in securing the co-operation of Mr. L. E. Marmont, of Maillardville, who collected extensively in that district. The material sent in by him was very desirable, as it contained several species new to British Columbia, besides a number of species previously recorded from the Interior.

From the material collected during the season the writer was enabled to mount over 1,200 specimens, comprising some 145 species; amongst these were four new to science, one new to North America, and about thirty new to British Columbia. We have also verified a number of species already listed and have added considerably to our knowledge of the known range of a great many species.

We hope during the coming season to continue this work and would be glad to hear from any collectors who would be willing to send in specimens in series, as there are without doubt a large number of species occurring in the Province of which we have no record at present.

Appended is a list of the species of Microlepidoptera taken at Victoria, Goldstream, and Maillardville during the past season which are not included in the 1906 Check-list of British Columbia Lepidoptera. Many of these are new records for the Province.

(Arranged according to Barnes & McDunnough's Check-list of the Lepidoptera of North America.)

Pyraustinæ.

4992. *Evergestis insulalis* B. & McD. Goldstream.
5144. *Pyrausta perrubralis* Pack. Goldstream.

Scopariinæ.

5245. *Scoparia torniplagalis* Dyar. Goldstream.

Crambinæ.

5347. *Crambus bidens* Zell. Maillardville.
5349. *Crambus dissectus* Grt. Victoria.
5364. *Crambus innotatellus* Wlk. Maillardville.
5446. *Dicymolomia metalliferalis* Pack. Victoria; Goldstream.

Phycitinæ.

5615. *Meroptera unicolorella* Hulst. Maillardville.

Pterophoridæ.

5858. *Oxyptilus delawaricus* Zell. Maillardville.

Gelechiidæ.

Recurvaria nanella Hub. Victoria.

Œcophoridæ.

Carcina quercana Fab. Victoria.

EUCOSMIDÆ.

6790. *Bactra furfurana* Haw. Maillardville.
6821. *Argyroploce nimbatana* Clem. Victoria; Goldstream; Maillardville.
6836. *Argyroploce galaxana* Kearf. Goldstream.
6862. *Argyroploce instrutana* Clem. Victoria.
6867. *Argyroploce dealbana* Wlk. Victoria; Goldstream.
6931. *Eucosma rorana* Kearf. Victoria.
7009. *Eucosma johnsonana* Kearf. Victoria.
7010. *Eucosma hopkinsana* Kearf. Victoria.
7030. *Eucosma solandriana* Linn. Victoria; Goldstream.
7113. *Proleopteryx emarginana* Wlshm. Victoria.
7162. *Enarmonia plumbolineana* Kearf. Goldstream.
7170A. *Tmetocera ocellana* D. & S. race *lariciana* Hein. Victoria.
7263. *Hemimene britana* Busck. Victoria.

TORTRICIDÆ.

7309. *Sparganothis inconditana* Wlshm. Victoria.
7313. *Sparganothis tunicana* Wlshm. Victoria; Goldstream.
7333. *Pandemis canadana* Kearf. Victoria; Goldstream.
Cacœcia hewittana Busck. Victoria.
Tortricodes fragariana Busck. Victoria.
7370. *Tortrix lomonana* Kearf. Victoria.
7374. *Tortrix peritana* Clem. Victoria; Goldstream.
Tortrix invidana B. & B. Victoria.
7416. *Peronea cervinana* Fern. Goldstream; Maillardville.
Peronea maximana B. & B. Goldstream; Maillardville.

GLYPHIPTERYGIDÆ.

7631. *Glyphipteryx bifasciata* Wlshm. Victoria.

PLUTELLIDÆ.

7639. *Euceratia castella* Wlshm. Victoria; Goldstream; Maillardville.
7641. *Abebœa subsylvella* Wlshm. Victoria.

YPONOMEUTIDÆ.

7703. *Argyesthia conjugella* Zell. Victoria.

HAPLOPTILIIDÆ.

7820. *Batrachedra prœangusta* Haw. Victoria.

GRACILARIIDÆ.

8048C. *Gracilaria alnivorella* Cham. race *sanguinella* Beut. Victoria.

TINEIDÆ.

8242. *Monopis crocicapitella* Clem. Victoria.

RARE AND UNCOMMON INSECTS TAKEN IN BRITISH COLUMBIA DURING 1920.

Notwithstanding the unfavourable climatic conditions during the past season, we are able to report more rare insects than we have in preceding years. Many collectors have sent in reports of their captures, accompanied in most cases with specimens for identification.

Victoria.—Mr. W. R. Carter took some interesting noctuids "at sugar" in the fall, which included *Euxoa obeliscoides* Gue.; *Agrotis ypsilon* Rott.; *Rhynchagrotis sambo* Sm.; *R. scopeops* Dyar; *Trachea cinefacta* Grt.; and *Eremobia claudens albertina* Hamp. A specimen of *Ipimorpha pleonectusa* Grt. was taken "at light," the first recorded for several years. The same collector picked up a dead specimen of *Oligia violacea* Grt. outside his house on August 21st. This was a most remarkable find, as it is the second specimen that we have any record of taken in British Columbia. The first one was captured at Clayoquot, on the west coast of

PLATE I.

SATURNIIDÆ AND NOCTUIDÆ.

Coloradia pandora Blake.
Victoria, B.C. (M. Brinkman).
(New to Canada.)

Oncocnemis hayesi Grt.
Kaslo, B.C. (J. W. Cockle).
(Very rare.)

Trachea separans Grt.
Maillardville, B.C. (L. E. Marmont).
(Very rare.)

Oncocnemis atrifasciata Morr.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Eremobia claudens albertina Hamp.
Goldstream, B.C. (E. H. Blackmore).
(Uncommon.)

Oncocnemis barnesi Sm.
Trail, B.C. (W. H. Danby).
(Very rare.)

Hyppa brunneicrista Sm.
Kaslo, B.C. (J. W. Cockle).
(Rather rare.)

Acronycta strigulata Sm.
Lillooet, B.C. (A. W. A. Phair).
(New to British Columbia.)

Feralia columbiana Sm.
Vancouver, B.C. (R. V. Harvey).
(Not common.)

Feralia deceptiva McDun.
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Schinia separata Grt.
Spences Bridge, B.C. (W. A. Newcombe).
(New to British Columbia.)

Vancouver Island, some eighteen years ago. Mr. A. L. Meugens took a beautiful specimen of *Polia vestora* Sm.; this is a rather uncommon species. He also captured a specimen of *Autographa metallica* Grt., the second recorded from Victoria, the writer taking the first in 1918. Amongst the geometrids taken by Mr. Meugens was a series of *Nemora unilinearia* Tayl. "at light" and a single specimen of *Dysstroma ethela* Tayl. taken on June 24th. This is rather a rare geometer and is the first specimen taken in Victoria.

Amongst the geometrids taken by the writer during the season the following are of more than ordinary interest: *Dysstroma occidentata* Tayl. (uncommon); *D. sobria subumbrata* Swett. (the first specimen taken since the type specimens in 1915); *Hydriomena manzanita* Tayl. (rare in Victoria); *Entephria multivagata* Hulst. (first record for Vancouver Island); and *Nematocampa limbata* Haw. (uncommon).

Mount Newton.—This locality is about 15 miles north of Victoria on the Saanich Peninsula and attains an elevation of 700 feet. On August 1st, at the invitation of Mr. John Dean, who has an ideal place situated about half-way up the mountain, the writer spent the day collecting, and amongst many good things taken were *Dysstroma sobria ochrofuscaria* Swett. (the first for several years); *Enypia packardata* Tayl.; and *Nepytia umbrosaria nigrovenaria* Pack. (the first specimen that I have taken).

Goldstream.—The writer collected extensively in this locality during the season and obtained many good things, the following being of special interest: *Euxoa brunneigera* Grt. (very rare); *Agrotis esurialis* Grt. (uncommon); *Parastichtis puta dusca* Sm. (rare); *Chlorosea nevadaria* Pack.; *Lygris atrifasciata* Hulst (first record from Vancouver Island); *Dysstroma truncata* Hufn.; *D. sobria* Swett (the first specimen captured since the unique type was taken in 1914); *Phengommataca edwardsata* Hulst (first specimen I have taken and first record from this locality); *Cleora albescens* Hulst (first recorded capture since 1911; very rare, vide Rep. Prov. Mus. Nat. Hist., B.C., 1918); and *Cleora latipennis* Hulst (very uncommon).

Mr. H. McKnight, who resides at Goldstream, took a number of noctuids in September, feeding on hops. On the front verandah of his house a large hop-vine is trained, and after it gets dark the noctuids begin to arrive and with the aid of a lantern are readily bottled. The moths are not easily disturbed and seem reluctant to leave the hops. Amongst the noctuids taken by him the following are of interest: *Euxoa brocha* Morr. (not previously recorded from Goldstream); *Mythimna olivata* Harv. (uncommon); *Matuta apposita* Grt.; *Rhynchagrotis sambo* Sm. (uncommon); *Graptolitha patefacta* Wlk.; *G. ferrealis* Grt.; *Eremobia claudens albertina* Hamp. (rare); and *Gortyna pallescens* Sm. (a very worn specimen, but undoubtedly this species).

Departure Bay.—While on a collecting trip to this district last July, Mr. E. P. Van Duzee, of the Californian Academy of Sciences, San Francisco, took a beautiful specimen of that rare geometer *Caripeta acqualaria* Grt. at rest on the under-side of a leaf. He also took a fine specimen of *Synaxis jubararia* Hulst. This is rather a remarkable capture, as this geometer makes its appearance early in October as a rule—my earliest date being September 26th. Why it should be on the wing in July is a mystery.

Alberni.—Amongst a collection of Lepidoptera made by Mr. John Redford, a resident of the district, we note the following: *Gortyna pallescens* Sm. (the second specimen taken in this locality); *Autographa rectangula nargenta* Ottol. (uncommon); *Plusia areoides* Grt. (uncommon); *Drepana bilineata levis* Hud. (rare); *Enypia packardata* Tayl.; *Nematocampa limbata* Haw. (uncommon); and *Evergestis straminalis* Hub.

New Westminster.—Mr. A. B. Baird, of the Dominion Entomological Branch, took several specimens of a medium-sized white moth which was identified by Dr. J. H. McDunnough, of Ottawa, as *Liparis salicis* Linn. (the satin-moth). This is a new moth to Canada and was probably imported on nursery stock from England. It feeds on Lombardy and other poplars and may turn out to be of economic importance. It is excessively abundant in England.

Maillardville.—Mr. L. E. Marmont, who collected persistently in this district in spite of the bad weather, took a number of very interesting insects, many of them rare and some of them new to the Lower Fraser Valley fauna. The following noctuids are worthy of more than passing mention: *Agrotis cynica perumbrosa* Dyar (previously known from Kaslo and Vernon); *Agrotis flavotincta* Sm. (uncommon); *Polia grandis* Bdv. (previously recorded from Kaslo); *P. nimbosa* Gue.; *Graptolitha thaxteri* Grt. (rare); *Trachea separans* Grt. (previously known

only from Windermere); *Acronycta minella* Dyar (known only from Kaslo and the Okanagan District); *A. innotata griseor* Dyar (not previously recorded from other than Kaslo, the nimotypical locality); *Arzama obliqua* Wlk. (rare), and *Panthea portlandia* Grt. (this specimen taken on earliest known date—i.e., April 14th; regular date of emergence is in July).

The geometrids taken included *Lygris harveyata* Tayl. (very rare); *Hydriomena renunciata columbiata* Taylor (uncommon); *Euphyia multiferata* Walk. (several specimens of this uncommon species taken at light); *Philobia ulsterata* Pears (Mr. Marmont reports this species common at light; it has previously been regarded as rather rare); and *Euchlæna tigrinaria sirenaria* Strecker (uncommon).

Hagensborg.—This locality is about 12 miles from Bella Coola and is in a very wet district. Mr. W. A. Sykes sent some material down that he had collected late in the season, but owing to the abnormal rainfall very little was taken. However, we were pleased to receive it, as scarcely any collecting has been done in this vicinity. The species received were: *Polygonia satyrus* Edw.; *P. faunus rusticus* Edw.; *Aglais J. album* B. & Le C.; *A. antiopa* Linn.; *Enargia citrata* Linn.; *D. citrata immanata* Haw.; *Ellopia somniaria* Hulst. (this record extends its known distribution); *Ennomos magnarius* Gue.; and *Synaxis jubararia* Hulst.

Lillooet.—Mr. A. W. Hanham, of Duncan, spent a week in this locality during the latter part of August. Most of his collecting was done on Mount McLean at altitudes varying from 3,000 to 6,500 feet. Some valuable material was taken, amongst which we note the following: *Argynnis hydaspe sakuntula* Skin. (a new locality for this form); *Euphydryas anicia* D. & H. (not previously known from here); *Plebeius scudderi* Edw. (known only from Atlin, vide Pro. B.C. Ent. Soc., No. 14, page 7, 1919); *Lasionycta sedilis* Sm. (previously known from Kaslo only); *Oncocnemis atrifasciata* Morr. (new to British Columbia); *Carsia paludata* Thun. (rare); *Itame epigenata* B. & McD. (new to British Columbia); *Pyla rainierella* Dyar (Mount Cheam only previous record); *Eucosma stygiana* Dyar (rare); and *Hepialus pulcher macglashani* Hy. Edw. (very local—we have no other record than Mount McLean). Mr. A. W. Phair has also taken it.

Amongst some material sent to us for identification by Mr. Phair the following are of special interest: *Euxoa andera* Sm. (rare and a new locality); *E. quinquelinea* Sm. (rare); *Septis barnesi* Sm. (not previously known from here); *Acronycta strigulata* Sm. (new to British Columbia); *A. moesta* Dyar (uncommon); *Andropolia theodori epichysis* Grt. (uncommon); *Catocala nevadensis montana* Beut. (rare); and *Eosphoropteryx thyatiroides* Gue. (very rare).

Enderby.—Mr. J. Wynne, who resides in this district, reports the capture of *Polia assimilis pulverulenta* Sm. and *Cirphis commoides* Gue. Both are good records. The former adds to our knowledge of the distribution of this rather rare noctuid, as our previous records are from widely distant localities—viz., Vancouver Island, Northern British Columbia (Taku River), and Kaslo. The latter (*commoides*) is also rare, our only records being from Kaslo and Penticton.

Kaslo.—A long list of captures has been sent in by Mr. J. W. Cockle, one of the oldest and most enthusiastic entomologists in British Columbia. The following are of special interest: *Aplectoides occidens* Hamp. (very rare); *Perigrapha achsha* Dyar (rare); *Platyperigea anotha* Dyar (rare); *Arzama obliqua* Wlk. (uncommon); *Panthea portlandia* Grt. (the third specimen taken in this district); *Autographa orophila* Hamp. (rare); *A. flagellum* Wlk. (second specimen taken at Kaslo); *A. sansoni* Dod (new to British Columbia); *Eupithecia tenuata* Hulst. (uncommon); *Macaria purcellata* Tayl. (rare); *Caripeta angustiorata* Wlk. (new to British Columbia); *Cleora satisfacta* B. & McD. (rare); *Gabriola dyari* Tayl. (rare in this district until this season, when Mr. Cockle captured five males and one female); and *Erannis vancouverensis* Hulst. (rare—one male taken, the first specimen taken since 1904).

Elko.—Mr. W. B. Anderson, Dominion Inspector of Indian Orchards, while on an inspection trip in this district took a short series of *Itame occiduaria* Pack. This geometer is rather rare in British Columbia collections, as it evidently is a Rocky Mountain species, our previous record being Cranbrook.

Sheep Creek, Kootenay-Columbia Valley. A nice series of *Eurymus alexandra emilia* Edw. was taken by Mr. Anderson in the latter part of July. He also took a specimen each of *Lygris atrifasciata* Hulst. and *Euchlaena astylusaria* Wlk. Mr. Anderson, whose duties take him over a large portion of the Province, reports that climatic conditions were bad in most localities and insect-collecting poor.

PLATE II.

GEOMETRIDÆ.

Lobophora simsata Swett.
(Male paratype.)
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Carsia paludata Thun.
Mount McLean, B.C. (A. W. Hanham).
(Rare.)

Drepanulatrix quadraria Grt.
(Male.)
Mount McLean, B.C. (G. O. Day).
(New to British Columbia.)

Drepanulatrix quadraria Grt.
(Female.)
Mount McLean, B.C. (G. O. Day).
(New to British Columbia.)

Itame epigenata B. & McD.
Mount McLean, B.C. (A. W. Hanham).
(New to British Columbia.)

Marmopteryx marmorata Pack.
(Under-side.)
Vaseaux Lake, B.C. (W. B. Anderson).
(Local.)

Metarranthis septentrionaria B. & McD.
Lillooet, B.C. (W. B. Anderson).
(New to British Columbia.)

Cleora satisfacta B. & McD.
Kaslo, B.C. (J. W. Cockle).
(Local.)

MICROLEPIDOPTERA.

Tortrix invidana B. & B.
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Scoparia torniplagolis Dyar.
Goldstream, B.C. (E. H. Blackmore).
(New to British Columbia.)

Carcina quercana Fab.
Victoria, B.C. (E. H. Blackmore).
(New to North America.)

Sparganothis tunicana Wlshm.
Goldstream, B.C. (E. H. Blackmore).
(New to British Columbia.)

Crambus bidens Zell.
Maillardville, B.C. (L. E. Marmont).
(New to British Columbia.)

Cacœcia hewittana Busck.
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Eucosma hopkinsana Kearf.
Victoria, B.C. (W. R. Carter).
(New to British Columbia.)

Peronea maximana B. & B.
Maillardville, B.C. (L. E. Marmont).
(New to science.)

Eucosma johnsonana Kearf.
Victoria, B.C. (W. R. Carter).
(Rather rare.)

New British Columbia Insects.

The following seventeen insects from British Columbia have been described as new to science during the year 1920. They comprise twelve species of Lepidoptera, one species of Coleoptera, two species of Hymenoptera (Parasitic), and two species of Diptera.

Lepidoptera.

Of the twelve species of Lepidoptera, two belong to the family Noctuidæ, one to the Lasiocampidæ, five to the Geometriadæ, one to the Pyralidæ, and three to the Tortricidæ. They are as follows:—

Noctuidæ.

Feralia deceptiva McDunnough. Described in the Can. Ent., Vol. 52, page 165, June and July, 1920, from two male specimens taken at Vancouver. This species had been previously associated with *Feralia columbiana* Smith. Further notes on both species will be found under the heading of "Illustrated Lepidoptera," with illustrations of both of them on Plate I.

Cænurgia erechtea Cram. form *parva* Blackmore. Described in Can. Ent., Vol. 52, page 226, Dec. 1920, from specimens of both sexes taken by the writer at Victoria.

Lasiocampidæ.

Tolype dayi Blackmore. Described in Can. Ent., Vol. 52, page 226, from seven specimens taken on Vancouver Island—Quamichan Lake (G. O. Day); Sluggett's (W. Downes); Victoria (E. H. Blackmore).

Geometridæ.

Lobophora simsata Swett. Described in The Lepidopterist, Vol. 3, page 123, Feb., 1920, from fourteen specimens taken by the writer at Victoria. A figure of this species will be found on Plate II. and more extended remarks upon it under the heading of "Illustrated Lepidoptera."

Eustroma nubilata Pack. form *macdunnoughi*, Blackmore. Described in Can. Ent., Vol. 52, page 267, Dec., 1920, from twelve specimens taken on Vancouver Island and the Lower Fraser Valley—Duncan (E. M. Skinner); Vancouver (R. V. Harvey); Fraser Mills (L. E. Marmont); Chilliwack (W. B. Anderson); Goldstream, Vancouver, Cloverdale, Rosedale (E. H. Blackmore).

Dysstroma sobria Swett form *swetti* Blackmore. Described in Can. Ent., Vol. 52, page 268, Dec., 1920, from ten specimens taken by the writer at Victoria. This large and handsome geometer was figured under the name of *mullcolata* Hulst in Rep. B.C. Prov. Mus. Nat. Hist., 1916, Plate VIII. In the light of later research *mullcolata* is considered to be the smaller white-banded form, which is in some years very abundant on Vancouver Island in the month of August; *swetti* occurs in normal years in mid-June and is rather uncommon.

Anthorhöe incursata Hub. race *lagganata* Swett & Cassino. Described in The Lepidopterist, Vol. 3, page 131, Feb., 1920, from two specimens taken by the late F. H. Wolley Dod. The male holotype was taken at Laggan, Alberta, and the female allotype at Field, B.C., on July 3rd, 1907.

Eulype albodecorata Blackmore. Described in Can. Ent., Vol. 52, page 269, Dec., 1920, from a long series of both sexes taken by the writer at Goldstream, B.C. This species is apparently distinct from *hastata* Linn., with which it flies, the latter, however, being from a week to ten days later putting in an appearance. In a long series of both species I have not known them to intergrade, although they are subject to a certain amount of variation within certain limits. On the other hand, *gothicata* Gue., which occurs sparingly at various points on the Mainland, shows considerable intergradation with *hastata*. Until these various forms are bred from the egg to the imago our proper understanding of this group will remain incomplete.

Pyralidæ (Pyralinæ).

Herculia florenccalis Blackmore. Described in Can. Ent., Vol. 52, page 270, Dec., 1920, from a single female taken by the late W. H. Danby at Rossland, B.C.

Tortricidæ.

The following three species were described by Messrs. Barnes & Busck in Cont. Lepid. No. Amer., Vol. IV., No. 3, page 215 *et seq.*, March, 1920:—

Tortrix dimorphana Barnes & Busck. Described from specimens taken at Duncan, B.C. (A. W. Hanham), and Victoria, B.C. (collector's name not given).

Tortrix invidana Barnes & Busck. Described from specimens taken at Duncan, B.C. (A. W. Hanham), and Victoria, B.C. (collector's name not given). During the past season the writer was fortunate in capturing four specimens of this new species, one of which is figured on Plate II.

Peronea maximana Barnes & Busck. Described from specimens taken at Duncan, B.C. (A. W. Hanham), and Victoria, B.C. (A. J. Croker). The writer has also taken this species at Goldstream, and Mr. L. E. Marmont took a nice series at Maillardville, B.C., one of these being figured on Plate II.

Coleoptera.

Aphodius canadensis Garnett. Described in Can. Ent., Vol. 52, page 139, June and July, 1920, from six specimens taken by Mr. C. B. Garrett at Cranbrook, B.C. (five), and Crowsnest, B.C. (one). This species is a small shiny black beetle about a quarter of an inch in length and belongs to the family Scarabidæ.

Hymenoptera (Parasitic).

Arotes maurus Rohwer. Described in Pro. U.S. Nat. Mus., Vol. 57, page 517, 1920, from two females taken at Mission, B.C. (collector's name not mentioned). This species belongs to the tribe *Acocnitini* of the family Ichneumonidæ. This new species of ichneumon-fly measures about three-quarters of an inch in length, with slightly yellowish hyaline wings with dark-brown veins.

Platycampus victoria MacGillivray. Described in Can. Ent., Vol. 52, page 59, March, 1920, from specimens bred by Mr. W. Downes at Victoria, B.C. This is the adult of the orange and black larvæ which are so destructive to the Lombardy poplar in Victoria during September. Reference was made by the writer in Rep. Prov. Mus. Nat. Hist., B.C., 1917, page 9, to a particularly bad infestation during that year. As the larvæ are so well known to the average Victorian, a short description of the adult insect taken from specimens bred by the writer several years ago may prove of interest. Head and thorax glossy black; body deep yellow, with two pairs of transparent, iridescent wings. On the front margin of the first pair of wings, two-thirds out from the body, is a blackish mark called the stigma. The antennæ or feelers are yellowish in the male and blackish in the female; the three pairs of legs are yellow. It measures about a third of an inch in length and four-fifths of an inch from tip to tip of the wings when spread out. My bred specimens emerged in the first week of June. This species belongs to the family Tenthredinidæ. They are popularly known as sawflies from the fact that the abdomen of the female is furnished with a pair of saws which can be pushed out and moved up and down. They are used for making slits in leaves or other vegetable tissue in which the eggs are laid.

Diptera.

Melina palustris Melander. Described in the Annals Ent. Socy. Amer., Vol. 13, page 316, Sept., 1920, from over 100 specimens ranging over a wide territory, including Idaho, Wyoming, Montana, Washington, and British Columbia. The specific locality in British Columbia is Nelson, where the specimens were collected by Mr. Melander. This is a small fly measuring about a fifth of an inch in length, with hyaline wings, a blackish body, and a greyish thorax. The flies belonging to this family are generally found on the borders of streams and in marshy places.

Euparyphus pretiosa Banks. Described in Can. Ent., Vol. 52, page 65, March, 1920, from a single female taken at Vancouver, but the name of the collector is not stated.

ILLUSTRATED LEPIDOPTERA.

Under this heading we hope to continue to illustrate species which have been recently described from British Columbia; those of rare and uncommon occurrence and those which have been confused with other species. Many of the species are here illustrated for the first time.

We have not illustrated in this report the six species described by the writer in Can. Ent., Vol. 52, page 266 *et seq.*, Dec., 1920, as an excellent plate accompanied the above article figuring each of the species described.

The number appearing before each name corresponds with a similar number in Messrs. Barnes and McDunnough's Check-list of North American Lepidoptera, 1917. Those with an asterisk prefixed to them have been described since the above "List" was issued.

Saturniidæ (Plate I).

782. *Coloradia pandora* Blake. This is rather a remarkable capture, as it is, I believe, the first record in Canada of this southern species. This specimen was taken by Mr. M. Brinkman in the early morning of July 18th at rest on the ground beneath an electric-light pole in Victoria West. It is a male and is in fine condition, with the exception of the scaling on the veins in the median area of the primaries, which is a little rubbed. The fore wings are brown in colour, with the extra discal line and the basal area of a darker brown; the transverse lines are edged with grey. The hind wings are somewhat translucent, with a dark extra-discal line and a dusky sub-marginal band. The inner margin is of a distinctly rosy hue. The antennæ are pale yellow, heavily pectinated, with the pectinations strongly curved, which is a characteristic of this group. There is a large round solid black dot on each wing.

This species belongs to the family Saturniidæ and is closely allied to *Pseudohazis eglanterina* Bdv. (the sheep-moth). It is an inhabitant of Colorado and has also been recorded from Nebraska, Arizona, and New Mexico, and in some years it is reported as being very common at Fort Klamath, in Southern Oregon. As the particular part of Victoria West in which it was captured is adjacent to a railway-yard where "foreign" cars stand until unloaded, it is reasonable to suppose that this specimen came in its pupal state in one of these cars and emerged upon or soon after its arrival here.

Noctuidæ (Plate I).

1160. *Schinia separata* Grt. This exceedingly pretty noctuid was taken by Mr. W. A. Newcombe at Spences Bridge on August 19th, 1919. This is the first record of this species in British Columbia and is also the first representative of the genus known to occur here. The genus *Schinia* contains a large number of species, most of them small and rather pretty. They are particularly abundant in the South-western States. Dr. J. B. Smith (Trans. Am. Ent. Soc., Vol. X., page 229, 1883) made *separata* a synonym of *acutilinea* Grt., but more recently it has been raised to its former status as a separate species. The ground colour of *separata* is light fawn marked with darker shades of the same colour, with the transverse lines white, narrowly edged with black. *Acutilinea* is a darker insect with the transverse lines more emphasized.

2018. *Oncocnemis hayesi* Grt. This is rather a rare insect, as, in fact, are all the species of this genus in this Province, with the possible exception of *O. chandleri* Grt. The localities given in "Dyar's List" (Bull. 52, U.S.N.M.) are Colorado, California, and British Columbia. As far as our records show, Kaslo is the only locality in the Province in which it has been taken. The specimen figured was taken by Mr. J. W. Cockle in August, 1913.

2061. *Oncocnemis atrifasciata* Morr. This is another new record for British Columbia and was taken by Mr. A. W. Hanham on Mount McLean, near Lillooet, B.C., at an altitude of 4,000 feet. It is an inhabitant of the Atlantic States, but has been taken in Manitoba and Alberta. It differs somewhat from Manitoban specimens in the dark-grey colour of the primaries and in the collar being tipped with white. It is also a trifle larger, and when a series can be secured it may prove to be a good geographical race. The date of capture was August 20th, 1920.

2062. *Oncocnemis barnesi* Smith. This striking species was described from Wyoming in Jour. N.Y. Ent. Soc., Vol. VII., page 37. It is exceedingly rare, the specimen figured being taken by the late Mr. W. H. Danby at Trail on June 30th, 1900. Mr. Cockle, of Kaslo, has also taken a specimen. The primaries are of a beautiful dove-grey, crossed by two distinct black lines, the veins on the outer margin being narrowly outlined in black.

2098A. *Feralia columbiana.* This species was described in Can. Ent., Vol. 35, page 9, Jan., 1903, from two males, one of which was taken at New Westminster by Dr. Fletcher in 1896. It is a most beautiful insect, the ground colour being a bright blue-green with heavy, black markings, some of which are edged with white. The specimen illustrated was taken by the late Captain R. V. Harvey at Vancouver on April 30th, 1904. It has also been taken sparingly at Victoria, Duncan, and Wellington, and recently I have identified a specimen from Mr. Cockle, of Kaslo, as this species.

* *Feralia deceptiva* McDunnough. Described in Can. Ent., Vol. 52, page 162, June and July, 1920, from two males taken at Vancouver by the late Arthur Bush. This is very close to the preceding species and is the same in coloration, but the maculation of the primaries is different, while the secondaries are darker, being wholly smoky-brown. A reference to the figures will show the differences between the two species.

This newly described species has also been taken at Victoria and Duncan, and is probably the same insect that was listed in the 1906 B.C. Check-list as *Momophana comstocki* Grt. They are closely related, but the latter is only known from the Atlantic States.

2288. *Trachea separans* Grt. This is a most remarkable capture, as the only previously recorded locality for this species in British Columbia is Windermere, in the foot-hills of the Rockies. It was recorded under the name of *ferens* Sm. by the late Wolley Dod in the Bull. B.C. Ent. Soc., April, 1908; *ferens* has now been made a synonym of *separans*. The specimen figured was taken by Mr. L. E. Marmont at Maillardville on July 10th, 1920.

2359A. *Eremobia claudens albertina* Hamp. In Cont. Lepid. No. Amer., B. & McD., Vol. II., No. 1, Plate XIII., Fig. 4, is illustrated a specimen of *albertina* from Duncan, V.I. In the latter part of May, while studying the splendid collection of noctuids belonging to Mr. G. O. Day, of Duncan, the writer recognized several specimens of this rather rare noctuid from the above-mentioned figure. A day of two later I found two or three more specimens in the collection of Mr. A. W. Hanham, which were taken in the same district. Strange to say, the species turned up in Victoria this season, Mr. W. R. Carter securing a specimen "at sugar" on August 21st. The writer also took a specimen in good condition at Goldstream "at light" on September 7th, and Mr. H. McKnight, of Goldstream, took another on September 26th, the latter, however, being rather worn.

2458. *Acronycta strigulata* Sm. This species is a new record for British Columbia and was taken by Mr. A. W. A. Phair, of Lillooet, B.C., on July 27th, 1920. It is interesting to note in this respect that, while Mr. Phair is an extremely busy man and does not find much time for collecting, he always manages to take each season one or more species new to the Province. The specimen is not in the best of condition, but we are glad to figure it as a new record. The species was originally described from Colorado (Ent. News, Vol. VIII., page 150, 1897).

2532. *Hyppa brunneicrista* Sm. The specimen figured was taken by Mr. J. W. Cockle, of Kaslo, on June 1st, 1914. We are very glad to have seen this specimen and to be able to figure it, as it has cleared up all doubts as to its presence in British Columbia.

In the 1906 Check-list both *brunneicrista* and *xylinoides* were listed from Wellington, Vancouver, and Kaslo. In Bull. B.C. Ent. Soc. No. 9, April, 1908, Wolley Dod states: "I believe this record (*brunneicrista*) to be entirely erroneous. The species I saw rather commonly in British Columbia collections under this name is the Pacific Coast form of *xylinoides* Grt." In a continuation of the same article (*Ibid.* No. 10, June, 1908), and under the heading of *Hyppa indistincta* Sm., he says: "Dr. Dyar records this from Kaslo, but I believe him to be wrong in referring *brunneicrista* Sm. to the synonymy. I have a specimen from Kaslo and took one at Laggan last July which agree with the figure and description of *indistincta*, and are, in my opinion, distinct from *brunneicrista*."

Recently Mr. Cockle has sent us specimens of all three species for examination, and while *indistincta* and *xylinoides* are close to each other, *brunneicrista* is abundantly distinct from both of them. It may be easily separated by the following characters: (*a*) The pectinations of the male antennæ are longer than in the other species; (*b*) the thorax laterally is solid reddish-brown; (*c*) the posterior thoracic tuft is distinctly rusty-brown; (*d*) a rusty-brown streak in the s.t. space near the anal angle. The general appearance of the insect also seems much darker.

Geometridæ (Plate II).

3939. *Marmopteryx marmorata* Pack. Mr. W. B. Anderson was fortunate enough to secure several specimens of this fine geometer at Vaseaux Lake, B.C., on May 25th, 1920. They had evidently newly emerged and were in perfect condition. A figure of the under-side is given to show the beautiful marbled effect on the hind wings. The ground colour is white with reddish-brown and dark-brown markings. A reference to this species was made in the Rep. Prov. Mus. Nat. Hist., B.C., page 18, 1919.

3945. *Carsia paludata* Thun. This species is one of the rarest geometers that we have and is a high-altitude species. The first record that we had of this species was a specimen taken by the late Mr. R. V. Harvey on the Hope Mountains on July 19th, 1906. No further record was obtained until last year, when amongst some geometrids sent to the writer for determination by Mr. J. W. Cockle, of Kaslo, another specimen of this species was found. Mr. A. W. Hanham, while collecting on Mount McLean last August at an altitude of 6,500 feet, captured several specimens, one of which we figure.

* *Lobophora simsata* Swett. This new species was described from a long series taken by the writer between May 5th and 10th, 1918. During the six years previous to that date the writer had only taken odd specimens; i.e., one in 1913, one in 1914, two in 1916, and four in 1917, all of which were taken in the suburbs of Victoria. Three of those taken in the latter year were brought to me by Mr. A. Robinson, who stated that he had taken them at rest on the side of his house. The following spring I asked him to keep a good look-out for them, and one day in early May he informed me that there were a number of small moths flying at sundown on a vacant lot adjoining his house which appeared to be the species that I wanted. Upon going over there the following evening I found to my great delight that this was the case, and, although a cool wind was blowing, I managed to net sixteen specimens. The weather conditions were not very favourable during the next few evenings, but with hard work and a great amount of beating nearly forty specimens were taken between us. Owing probably to the extreme wet weather, none were seen in 1919. That winter the ground was cleared and ploughed over for cultivation and I have not seen a specimen since.

4326. *Drepanulatrix quadraria* Grt. This is a new record for British Columbia and was taken by Mr. G. O. Day while on a collecting-trip at Lillooet in July, 1919. It was described in Can. Ent., Vol. XIV., page 185, 1882, and the localities given for it are California, Colorado, and Nevada. The sexes are dissimilar and we have figured a specimen of each.

* *Itame epigenata* B. & McD. This species was described from Truckee, Calif., in Cont. Lepid. No. Amer., Vol. III., No. 4, page 238, March, 1917. The specimen figured was taken by Mr. A. W. Hanham in August last on Mount McLean at an altitude of 6,000 feet and is a new addition to our list.

It also occurs at Kaslo, as the writer has recently seen a specimen taken by Mr. Cockle which agrees very well with the Lillooet specimen. This is probably the same species as Dr. Dyar records (Lepid. Koot. Dist., 1904) under the name of *bitactata* Wlk. from Sandon (one) and Kaslo (one). The two species are closely allied, but it is more reasonable to suppose that *epigenata* would extend its range northward from California than that *bitactata* would extend westward and cross the Rocky Mountains.

Cleora satisfacta B. & McD. This is also a new addition to our list, having been described (Cont. Lepid. No. Amer., Vol. III., No. 4, page 244, March, 1917) from a pair taken by Mr. Cockle at Kaslo, B.C. This is a rather rare geometer at Kaslo and very few specimens have been taken until this season, when Mr. Cockle had the good fortune to secure three of them. We are glad to be able to figure this species, as we have previously figured the other two British Columbia species of this group; i.e., *excelsaria* Streck, Rep. Prov. Mus., 1917, Plate II., and *albescens* Hulst., *ibid.*, 1918, Plate II.

Dr. J. H. McDunnough has recently revised the whole of the genus *Cleora* (Studies in North American Cleorini, Bull. 18 (Tech.), Dept. Agric., Ottawa, No. V., 1920) and has erected many new genera, including *Stenoporpia*, which receives the three above-mentioned species.

Metarranthis septentrionaria B. & McD. This species was described in Cont. Lepid. No. Amer., Vol. III., No. 4, page 257, March, 1917, from specimens taken at various points in Manitoba. The specimen illustrated was taken by Mr. W. B. Anderson at Lillooet on May 19th, 1918. It is closely allied to *duaria* Gue., but is separated from that well-known species by the ruddy-brown shading on the median area, which causes the latter to stand out as a dark band. There are also differences in the course of the extra and intra-discal lines.

The genus *Gonodontis* has been separated into two groups on account of the differences in the male genitalia, *duaria* and its allies being placed in Warren's genus *Metarranthis*.

Microlepidoptera (Plate II).

5245. *Scoparia torniplagalis* Dyar. This rather well-marked scoparid was taken by the writer at Goldstream on August 12th. It is a new accession to the list and must be somewhat rare, as out of a large number of specimens of this genus taken during the past season only three proved to be of this species.

Carcina quercana Fabr. This is rather a remarkable capture, as it is a new record for North America. It is fairly common in some parts of England and has an extended distribution throughout Europe, but has never before been recorded from any part of North America. The writer was fortunate in securing seven specimens during the past season, the dates being as

follows: July 16th (one); July 29th (two); August 4th (one); August 10th (two); and August 12th (one). Strange to relate, six of the seven specimens were taken in my own garden.

It is a very pretty moth, the ground colour of the primaries being of a dull pink, with an oblong yellow patch on the costa, and the long fringe of the outer margin is also yellow. It belongs to the family Œcophoridæ. In a recent letter Mr. A. Busck, of the United States National Museum, states that we should find the larva spinning a flat web on the under-side of oak, apple, or willow.

5347. *Crambus bidens* Zell. This is an unexpected record, as its habitat is Eastern Canada and the New England States. A nice series of this pretty crambid was taken by Mr. L. E. Marmont at Maillardville. It was on the wing from the end of July until the middle of August, but was extremely local. It is very closely allied to *pascuellus* Linn., with which species it is liable to be confused.

7009. *Eucosma johnsonana* Kearf. This exceedingly pretty species was described in Trans. Am. Ent. Soc., Vol. 33, page 36, Jan., 1907, from five specimens, which included a female from Victoria (Rev. G. W. Taylor) and a male from Vancouver Island. According to Mr. Busck this species is rather rare in collections. Mr. W. R. Carter, however, secured three nice specimens during the past season, the best of which, taken on July 29th, is figured.

When in good condition it is a very pretty insect, presenting a rosy-pink appearance. The upper portion of the primaries are salmon-pink, with the lower half of the basal area a deep rose-pink, bordered by a narrow band of blackish scales.

7010. *Eucosma hopkinsana* Kearf. This is another of Mr. Carter's captures and is apparently new to British Columbia. It was described (*ibid.*, page 37) from two specimens taken at Hoquiam, Wash. Four specimens were taken by Mr. Carter during August, one of which is illustrated. The primaries are of a light green, marked with lines and shades of black and fuscous.

7313. *Sparganothis tunicana* Wlshm. A short series of this pretty brown and yellow tortricid was taken by the writer at Victoria and Goldstream during July and August. Mr. Busck considers this species to be an extreme variety of the immaculate *inconditana* Wlshm. Two specimens of the latter were also taken by me at Victoria in July last.

* *Cacœcia hewittana* Busck. This species was described in Can. Ent., Vol. 52, page 125, June and July, 1920, by August Busck from a large series bred from raspberry at Sydney, Nova Scotia. It is evidently a general feeder, as the writer bred a long series from larvæ feeding on apple, pear, cherry, and laurel. The adults began to emerge on July 4th and continued doing so until about the 15th. They are very variable in the coloration of the fore wings, the ground colour ranging from light ochreous, reddish ochreous, to fawn and dark brown.

It is rather surprising to see this species here in such numbers and it evidently has a wide distribution. Mr. Busck informs me that he also has the species from Toronto.

* *Tortrix invidana* Barnes & Busck. The writer took several specimens of this new species in August and September, one of which proved to be a male. This is the first male recorded, the type specimens being all females. The ground colour is sordid white, with grey bands and markings edged narrowly with black. It is rather uncommon.

* *Peronea maximana* Barnes & Busck. This is one of the largest of our British Columbia tortricids and is rather a handsome moth. Mr. Marmont took a long series at Maillardville from the middle of September and extending away on into October. The ground colour varies from a very light grey to dark grey, with a series of reddish-brown markings on the costal edge of the fore wing. The amount of reddish-brown scaling is also very variable, some of the specimens having comparatively little, while others are heavily strigulated. Mr. Marmont's specimens were all taken at rest in a grove of second-growth alders a short distance away from his home, and this is probably their food-plant.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

COMMISSIONER OF FISHERIES

FOR THE YEAR ENDING DECEMBER 31ST, 1920

WITH APPENDICES

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith a report reviewing the operations of the Provincial Fisheries Department for the year ending December 31st, 1920, with Appendices.

WILLIAM SLOAN,

Commissioner of Fisheries.

Provincial Fisheries Department,

Commissioner of Fisheries' Office,

Victoria, British Columbia, March 31st, 1921.

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FISHERIES COMMISSIONER'S REPORT FOR 1920.

Value of Canadian Fisheries and the Standing of Provinces.

The value of the fishery products of Canada for the year 1919 totalled $56,508,479, as against $60,250,514 for the preceding year, a decrease of $3,764,935.

During the year 1919 British Columbia produced fishery products of a total value of $25,301,607, or 44.7 per cent. of the total for the Dominion.

British Columbia again led all the Provinces of the Dominion in the value of her fishery products. Her output in 1919 exceeded that of Nova Scotia by $10,129,678, and exceeded that of all the other Provinces combined by $9,267,654.

The following statement gives in the order of their rank the value of the fishery products of the Provinces for the years 1918 and 1919, together with the amount of the increase or the decrease:—

Value of Fisheries by Provinces, 1918 and 1919, with Increase or Decrease.

Province.	1918.	1919.	Increase or Decrease compared with 1918. (Inc.+; Dec.—.)
British Columbia	$27,282,223	$25,301,607	—$1,980,616
Nova Scotia	15,143,066	15,171,929	+ 28,863
New Brunswick	6,298,990	4,979,074	— 1,319,916
Quebec	4,568,773	4,258,731	— 310,042
Ontario	3,175,111	3,410,750	+ 235,639
Prince Edward Island	1,148,201	1,536,844	+ 388,643
Manitoba	1,830,435	1,008,717	— 821,718
Saskatchewan	447,012	475,797	+ 28,785
Alberta	318,913	333,330	+ 14,417
Yukon	37,820	8,800	— 29,020
Totals	$60,250,544	$56,485,579	—$3,764,965

The Species and Value of Fish caught in British Columbia.

The total value of each species of fish taken in British Columbia for the year ending December 31st, 1919, is given in the following statement:—

Salmon	$17,537,166
Halibut	4,617,484
Herring	1,109,870
Whales	648,868
Pilchards	371,871
Cod	368,838
Black cod	116,580
Flounders, brill, plaice, etc.	130,940
Soles	90,848
Crabs	55,102
Clams and quahaugs	47,754
Red cod	39,413
Oysters	38,659
Perch	19,808
Grayfish	17,822
Shrimps	17,528
Smelts	14,682
Octopus	6,760
Carried forward	$25,249,993

THE SPECIES AND VALUE OF FISH CAUGHT IN BRITISH COLUMBIA—*Continued.*

Brought forward	$25,249,993
Sturgeon	5,636
Skate	3,126
Oolachans	2,045
Fur-seals	1,294
Shad	667
Tomcod	498
Hake and cusk	475
Bass	336
Whiting	284
Eels	222
Fish-oil	35,097
Fish-offal	450
Fish scrap and fertilizer	19,306
Total	$25,319,429

THE SALMON-PACK OF 1920.

The salmon-pack in the Province for the year 1920 totalled 1,187,616 cases. It was 205,540 cases less than in 1919 and 428,541 cases less than in 1918, the year of the high record pack in the Province. The pack of chum salmon for the season totalled but 84,626 cases, as against 372,035 cases in 1919 and 527,615 cases in 1918, the decrease being due to a lack of market for this grade. There was a large carry-over of the pack of 1919.

The catch of sockeye from all the waters of the Province totalled 351,405 cases, as against 369,445 cases in 1919 and 276,459 cases in 1918, the decrease of 1920 being due to a light run of sockeye on the Skeena.

The catch of red, white, and pink spring salmon totalled 118,301 cases as against 100,551 cases in 1919 and 107,354 cases in 1918. The pack of pink salmon totalled 520,856 cases, as against 346,639 cases in 1919 and 527,745 cases in 1918.

THE 1920 SALMON-PACK BY DISTRICTS.

The Fraser River.—The total pack of all grades of salmon in the Fraser River District of the Province in 1920 totalled 136,661 cases, as against 163,123 cases in 1919, 276,459 cases in 1918, and 330,209 cases in 1917, the total pack being the smallest made on the Fraser since 1916. The catch of sockeye in Provincial waters of the Fraser River system shows a gain over the two preceding years, with a total of 48,399 cases, as against 34,068 cases in 1919 and 19,697 cases in 1918.

The season's pack of sockeye in the State of Washington waters of the Fraser River system in 1920 totalled 62,654 cases, as against 64,346 cases in 1919.

The total pack of sockeye in the entire Fraser River system in 1920 was 111,053 cases, as against 116,783 cases in the fourth preceding year, 1916—the brood-year of the 1920 run—showing that for the first time in several cycles of the lean years in the system there was but a small decrease.

The Salmon-catch in Northern Waters.

The Skeena River.—The salmon-catch in the Skeena River in 1920 produced a total pack of 332,887 cases, as against 398,877 cases in 1919 and 374,306 cases in 1918. There was a marked falling-off in the run of sockeye in comparison with the runs in the two preceding years, the catch producing a total pack of but 89,364 cases, as against 184,945 cases in 1919 and 123,322 cases in 1918.

Since the run of sockeye to the Skeena this year must be credited to propagation in the years 1915 and 1916, it is of importance to note that the run of 1915 produced a pack of 116,553 cases and that of 1916 but 60,923 cases, because it shows that the run this year was the product of the spawning of two years, one of which gave a pack greater than the average for the last eight years and the other a pack much below the average for that period. Only by resorting

to averages of catches for a period of years can it be ascertained with a degree of certainty whether the supply is on the whole diminishing or increasing. The average of the catch of sockeye on the Skeena in four-year cycles from 1903 to 1919 is shown in the following statement:—

	Cases.
Average pack from 1903 to 1906	78,868
" " 1907 to 1910	130,851
" " 1911 to 1914	101,664
" " 1915 to 1919	91,477

Considering that the pack of 1920 is less than that of the average for the four preceding years and very much below that from 1907 to 1914, and the fact that the number of canneries and the amount of fishing-gear employed on the Skeena was relatively constant up to 1918, also that in both 1918 and 1919 the amount of gear was greatly increased and the price paid fishermen was also increased, it must be conceded that conditions on the Skeena are not satisfactory and call for careful and conservative treatment. The records there indicate unmistakably that fishing for sockeye should be diminished and not increased.

Rivers Inlet.—The catch of salmon at Rivers Inlet for 1920 produced a total pack of 133,248 cases. It was the greatest since the high record pack of 1915. The sockeye-catch in 1920 produced a pack of 125,742 cases. It was but 5,000 cases less than the largest pack of sockeye ever made at that inlet. The catch of sockeye made there this year, as usual, consisted of both 4- and 5-year-old fish, and in consequence must be credited to the hatches from the spawnings of the years 1915 and 1916. The run in 1915, which produced the record pack at the inlet, consisted of 87 per cent. of 5-year-old fish, and the catch of 1916, which gave the smallest pack on record, contained 76 per cent. of 5-year-old fish. The run this year was therefore derived from both the biggest and the smallest runs recorded, and both of those runs consisted very largely of 5-year-old fish. The catch this year again demonstrates, as Dr. Gilbert pointed out last year, that the 5-year-old group has nearly always been in the majority in the Rivers Inlet run, the average for the last eight years being 39 per cent. of the 4-year class and 61 per cent. of the 5-year class.

Fishery Overseer A. W. Stone, who has for the past nine years annually inspected the spawning area of Rivers Inlet run, reports the fish found there in 1920 compared favourably, both in numbers and in size, with those of any former year—again demonstrating that the seasons of large catches usually show a large escapement and an abundant seeding of the spawning areas.

The Nass River.—The salmon run to the Nass River this year was again distinctly disappointing, the total pack of 81,150 cases being less than the average for the last seven years. Previous to that time the pack consisted almost wholly of sockeye. The run of sockeye was much the smallest yet recorded there. It produced a pack of but 16,740 cases, as against 28,259 cases in 1919, 21,816 cases in 1918, 22,188 cases in 1917, and 31,411 cases in 1916. The catch of sockeye on the Nass from 1909 to 1920 produced an average pack of 28,917 cases. Conditions there are distinctly alarming and call for most conservative action. If conditions are not radically changed the Nass River must be classed in the list of depleted streams. Fishing for sockeye has been more extensive than the run to that river will stand. The drain is far too heavy.

The Vancouver Island Section.

The salmon-pack on Vancouver Island totalled but 84,170 cases, as against 276,519 cases in 1919 and 206,023 cases in 1918. The decrease is to be attributed to the lack of demand for the fall-running species. There being little demand for chums resulted in a pack of but 12,591 cases, as against packs of 128,013 cases in 1919, 251,266 cases in 1918, and 240,000 cases in 1917. The catch of sockeye made by the traps on Vancouver Island is, as usual, credited to the Fraser District, because the fish taken were bred in that river and were seeking its waters when caught. The catch of sockeye in the traps produced a pack of only 3,801 cases, the smallest on record. The pack of all other species was small.

Trolling for salmon on the west coast of Vancouver Island was vigorously prosecuted by a large fleet of power-boats, but owing to rough weather the catch was less than in recent years. Most of the fish caught were shipped in a fresh state.

REPORTS FROM THE SALMON-SPAWNING AREAS OF THE PROVINCE IN 1920.

Following the custom of former years since 1901, the Department conducted investigations of the spawning areas of the Fraser, Skeena, and Nass Rivers and Rivers and Smith Inlets. Detailed reports from each section will be found in the Appendix of this report.

The Fraser River.—The spawning-grounds of the Fraser River basin were again inspected by John P. Babcock, Assistant to the Commissioner. He was assisted by Inspector of Fisheries C. P. Hickman. In Mr. Babcock's report it is shown that the number of sockeye that reached Hell's Gate Canyon, in the Fraser above Yale, was larger than in any recent lean year and compared favourably with the number that reached there in the big year 1917. The fish appeared there in larger numbers in July than for a number of years, and the run in August was also larger.

During August sockeye were seen passing up the Thompson, the first lean year in many years that their presence in that great tributary of the Fraser has been noticed. Several arrests of Indians for taking salmon from that river were made in August, one Indian having taken upwards of 100 sockeye. The Department again attempted to collect data from the sockeye run in that river, but, not anticipating that any number could be taken there, the gill-nets were set too late to produce sufficient data to be of value. Notwithstanding that the sockeye run up the Thompson was noticeably better than in recent years, the Department was unable to show that any considerable number reached any one of the tributaries of Shuswap Lake, at the head of the Thompson River. There are many large tributaries of that great lake, in which the sockeye formerly spawned in great numbers, which offer extensive areas for spawning, but in none of them could sockeye be found in considerable numbers.

The Skeena River.—The spawning-beds of the Skeena, which were inspected by Fishery Overseer R. Gibson in September, apparently were not as well seeded as usual. The number of sockeye that spawned in several tributaries of Babine and Lakelse Lakes was much less. The run to most sections is reported to have been no larger than in 1916, which was the poorest year on record. Owing to freshets which damaged the weirs placed in streams by hatchery officials, the total sockeye-egg collection at the hatchery on the Skeena was less than in recent years, the eggs collected totalling but 7,734,000.

The Nass River.—The sockeye-spawning beds of the Meziadin watershed of the Nass River were again inspected by Inspector of Fisheries C. P. Hickman in September. As in former years, the extreme upper sections of the Nass River basin, which include Lake Bowser, were not visited owing to their extreme inaccessibility. In a summary of the results of his inspection this year Mr. Hickman states: "I am of the opinion that the run of sockeye to the Meziadin section of the Nass was not as large as in any former year of record, with the possible exception of 1919. The run of spring salmon was good and there appeared to be a greater number of cohoe in the watershed than were found in my former inspection."

Referring to the condition of the fishway at the falls on the Meziadin River, Mr. Hickman states that the salmon have no difficulty in entering or passing through the fishway. The channel of the river approaching the entrance to the fishway has been considerably improved by Dominion officers, but is far from satisfactory, being still partly obstructed with rubble-rock deposited there during the great flood of 1917–18. The removal of all that rock—the entire clearing of the channel below the fishway—is most desirable.

It has been suggested that a fishway should be constructed on the right bank of the falls. Mr. Hickman comments on the suggestion and states that the building of an additional fishway would be a good thing, but "from what I know of conditions before and after the present fishway was built and up to 1918, I am of the opinion that if all the rubble-rock is removed from the channel below the entrance to the present fishway an additional fishway is unnecessary. Following the years that the fishway was in its original condition, there certainly was no assembly of salmon below the falls on the right bank. It must be appreciated that it is most difficult to do any work at the falls, because they are most difficult of access. The trail over the Bear River Glacier has virtually been destroyed. There are now no bridges over Bear or Beaver Rivers or Surprise Creek. No one can get in with pack-horses. There are no residents, either whites or Indians. When the present fishway was built the trail was open and the streams bridged, and the powder, cement, tools, and food for the men, which were all taken in, passed over the trail on pack-horses. At present everything must be packed in by men unless a seaplane is used."

Smith Inlet.—The spawning-beds of the Smith Inlet sockeye run were again inspected by Fishery Overseer A. W. Stone. Importance was attached to this inspection this year since it would demonstrate the effects of the closing of Qualla Creek to net-fishing. The wisdom of preventing fishing in that entrance to the spawning area is fully demonstrated by Mr. Stone's report. There was a very substantial increase in the number of sockeye found on the beds this year over those found in the brood-years of this year's run, 1915 and 1916.

Rivers Inlet.—Fishery Overseer A. W. Stone again inspected the sockeye-salmon spawning-beds of the Rivers Inlet run. His report is of a most reassuring character. He states:—

"As a summary of the result of my inspection of all the tributaries of Owikeno Lake, which furnish the spawning-beds to the Rivers Inlet run of sockeye, I submit that all the tributaries were as well, if not better, stocked than in any year of record, and very much better stocked than in any year since 1915. Notwithstanding that the catch of sockeye at Rivers Inlet this year produced a pack of over 125,000 cases, sufficient fish escaped capture to adequately stock all the beds. The majority of the sockeye found there this year were exceptionally large and consisted of 5-year-old fish. Conditions on the beds this year were as satisfactory as in 1915, the brood-year of the 5-year-old fish that ran this year. It will be recalled that in 1915 I reported that the beds were better seeded than in any former year of record. The great run this year unquestionably is due to the exceptional seeding of 1915."

Salmon Data from the Sockeye Run to the Fraser.

The Department collected the usual data of the runs of salmon to Provincial waters during the year. It was again submitted to Dr. C. H. Gilbert. Before he could complete his examination and forward a report he met with a physical disability which compelled him, temporarily, to discontinue the work. Dr. Gilbert, however, had previously forwarded a partial report on the 1920 sockeye run to the Fraser, dealing with the appearance in the run of 1920 of grilse and showing its relation to the 1921 run, which is reproduced in the Appendix of this report and which will be found of especial value to those interested in the Fraser fishery, as it is in the nature of a forecast as to the size of the run in 1921.

Fishermen and canners on the Fraser have known for a considerable period that the sockeye run in the year before "the big runs" was made conspicuous by the occurrence of large numbers of greatly undersized individuals, which constituted a class apart from the main run, and that in the small years of each cycle they were rarely present. These fish—undersized, all males, and their flesh pale in colour and poor in oil—were, by discriminating canners, packed separately as an inferior grade. In consequence it was possible to compare their abundance in the years of their occurrence with the runs of four, or eight, or twelve years previous. The relative number of undersized sockeye found in the run previous to the big year furnished some basis for forecasting the size of the run in the big year. The reason for such possible direct relation between the two years became apparent in Dr. Gilbert's investigation of the age of salmon. He demonstrated that whereas the usual run of sockeye to the Fraser matured in the fourth year of their age, the undersized males, or grilse, as they are termed, matured in their third year and therefore made their appearance in the run one year earlier than the 4-year-old fish which resulted from the same spawning. If the spawning of the previous big year had been an unusually successful one, it might be expected to result in an exceptionally large run of grilse three years afterwards, and an equally exceptionally large run of 4-year fish in the following year. Dr. Gilbert began his investigations of the life of the sockeye on the Fraser in 1911. Since then he has annually determined the component parts of each run. In consequence he has shown the proportion of grilse in the runs of 1912, 1916, and 1920. In the first of these, 1912, the grilse had developed from eggs laid down in 1909. In the latter year the catch produced a pack of over 1,500,000 cases and the spawning-beds were abundantly seeded. The grilse then of 1912 came from a successful season and the proportion which they formed of the 1912 run could be accepted as an approximate statement for the corresponding years of the previous cycles. Tests made throughout that season indicated that about one fish in five of the total run was a grilse. The run in 1912 was followed in 1913 by a run of the first magnitude. It produced a pack of 1,400,000 cases. With this data Dr. Gilbert approached the run of 1916. The grilse that ran that year were developed from the eggs deposited in 1913, the year of the fatal blockade in the Hell's Gate Canyon, which cut off the run to the upper spawning-beds. His examination of the 1916 run showed but one-fourth as many grilse as the 1912 run, and it is equally a matter

of record that the pack of 1917, compared with that of 1913, showed an equal reduction. To determine the run in 1921 the same two lines of evidence are available—that derived from the poorly seeded spawning-beds in 1917 and that derived from the number of grilse that were found in the run of 1920. The reports from the spawning-beds in 1917 showed that they were less seeded than in 1913. The numbers of spawning sockeye throughout the up-river district in 1917 were less numerous than in many lean years and far less numerous than in 1913, and in consequence could not be expected to produce as good a run. The material to establish the number of grilse in the 1920 run was collected with care at close intervals throughout the season, and consisted of scales for age-determination and data as to length and sex of 1,900 fish. By microscopic examination of the scales Dr. Gilbert determined the age of each of this complete series. In the entire collection but three grilse were found. In 1912 one fish in five was a grilse and in 1916 they were but one-fourth as numerous. "In so far, then, as the number of grilse can be considered an index of the size of the run in the following year," Dr. Gilbert concludes, "the evidence from the 1920 run wholly agrees with that derived by Mr. Babcock from the condition of the up-river spawning-beds of the Fraser in 1917. From both of these lines of evidence the conclusion is forced upon us that 1921 will range itself definitely with the lean years of the Fraser, which for three years of the previous cycle produced an average pack for each year of 265,000 cases, and for the corresponding three years of the present cycle an average pack each year of 90,000 cases."

The evidence submitted by Dr. Gilbert forces the conclusion that "the big year" of the Fraser must be recognized "wholly a thing of the past," and that "any method which might be successful in re-establishing it would be equally successful in raising the traditional lean years of the Fraser from their present low estate to an equality with the old-time 'big years,' when untold millions of spawning sockeyes fought their way through the rapids of the Yale Canyon and distributed themselves over the unequalled spawning areas of the upper river."

THE HALIBUT-FISHERY.

The catch of halibut landed at ports of the Province in 1920 totalled 22,089,035 lb., as against 19,198,565 lb. in 1919 and 16,697,000 lb. in 1918. The landings at Provincial ports in 1920 were over 44 per cent. of the total landing at all Pacific ports in that year. Prince Rupert again led in the landings, with a total of 18,941,035 lb. to Vancouver's 3,148,000 lb.

The total landings of halibut at all Pacific ports in 1920 totalled 49,816,950 lb., as against 43,534,195 lb. in 1919 and 39,212,564 lb. in 1918. The gain in the catch of the last two years over that of 1918 is the result, to a large extent, of the taking of a greatly increased quantity of undersized fish known to the trade as "chickens." These small fish, as was shown in the Department's reports for 1915 and 1916, are immature. Halibut do not spawn until their eleventh year. The fact that the fishermen bring in these small fish, for which they get a much smaller price than for adults, is evidence that they cannot now, as formerly, make a catch of adult fish. The gain in the total catch of the last two years over that of the low record year 1918 has been made at the expense of the future. It has been an overdrain that the stock on the banks cannot long endure.

Car shortage and the rate of exchange diverted many halibut cargoes from Prince Rupert to Seattle. The bulk of the catches were made by independent fishing-vessels, many of the company boats being laid up for most of the season owing to the cost of operation.

WHALES.

The whaling-stations at Kyuquot, Rose Harbour, and Naden Harbour, in the Province, were operated in 1920. A total of 493 whales were taken, as against 432 in 1919. The stations produced 604,070 gallons of oil, 1,033 tons of fertilizer, and 320 tons of whalebone and meal.

Ten whaling-stations were operated on the Pacific Coast of America in 1920. A total of 1,763 whales were taken, of which 170 were belugas taken in Alaska which have not heretofore been utilized. The production of whale-oil on the Coast in 1920 totalled 2,129,956 gallons.

COLD-STORAGE OF FISH.

Owing to a lack of market for trawl-caught fish and the cost of operating, the trawling companies withdrew their vessels early in the season. A total of only 13,786,000 lb. of fish were placed in cold storage in the Province in 1920, as against 17,157,000 lb. in 1919. It is difficult

to understand why the public does not more commonly avail itself of the sole, flounders, brill, etc., that are offered at a much less price than halibut and salmon. They are abundant in our waters and are equal in food value to any fish on the market.

The following statement of the salmon-eggs placed in the hatcheries of the Province in 1920 is furnished by Major J. A. Motherwell, Chief Inspector of Fisheries for the Dominion:—

Statement showing Total Number of Eggs placed in Various Hatcheries in British Columbia, 1920.

Name of Hatchery.	Sockeye.	Cohoe.	Springs.	Chums.
Anderson Lake	10,142,450	.....	.....	.....
Babine Lake	5,000,000	.....	.....	.....
Cowichan Lake	1,171,000	2,464,000	569,500	2,108,000
Cultus Lake	.....	880,000	.....	.....
Harrison Lake	4,936,000	83,000	3,922,000	3,619,000
Kennedy Lake	9,577,000	.....	.....	.....
New Westminster	.....	205,000	100,000	.....
Pitt Lake	4,360,000	234,000	.....	.....
Pemberton	26,000,000	.....	.....	.....
Rivers Inlet	12,077,000	.....	.....	.....
Stuart Lake	4,370,000*	.....	.....	.....
Skeena River	7,734,000	.....	.....	.....
Totals	85,367,450	3,866,000	4,591,500	5,727,000

* Collected from Skeena River basin.

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APPENDICES.

THE SPAWNING-BEDS OF THE FRASER RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit the following report of my annual inspection of the salmon-fishing and the salmon-spawning area of the Fraser River system during the season of 1920:—

The catch of all species of salmon from the Provincial waters of the Fraser River system this season produced a total pack of 136,661 cases, as against 163,123 cases in 1919, 276,459 cases in 1918, 330,209 cases in 1917, and 127,472 cases in 1916. The pack consisted of 48,399 cases of sockeye, 22,934 cases of cohoe, 24,123 cases of spring, and 23,884 cases of chum. The catch of sockeye in the Provincial waters of the system shows a gain over that of the preceding year, and was 16,253 cases greater than that made in those waters in the fourth preceding year. The catch of sockeye made by the traps in Provincial waters of Juan de Fuca Strait, which are credited to the Fraser, was the smallest ever made there, producing a pack of but 3,801 cases. The catch of sockeye made in the Gulf of Georgia and the Fraser River proper was greater than in any recent lean year. The fish ran earlier than usual, one-quarter of the entire season's catch being made in July.

The season's catch of sockeye in the State of Washington waters of the Fraser River system produced a pack of 62,654 cases, as against 84,637 cases in the preceding fourth year, a decrease of 21,983 cases.

The total catch of sockeye in the waters of the entire Fraser River system in 1920 produced a pack of 111,053 cases, as against 116,783 cases in its brood-year—(1916), showing that for the first time in several cycles of lean years there was but a slight decrease in the catch. As has been pointed out in previous reports, minor fluctuations in the catch in the lean years do not come as a surprise and are not of importance in view of general conditions on the Fraser. Slight increases in the pack over that of preceding years would be without significance, since fluctuations are bound to occur in all streams where a general decline in the catch is shown.

Though the number of men engaged and the amount of fishing-gear used in the entire district was the smallest for many years, the catch was made at the highest cost on record.

I made my seventeenth annual inspection of the principal salmon-spawning area of the Fraser River basin during July, August, September, and October. I was assisted by Inspector of Fisheries C. P. Hickman, and am indebted to Dominion Fishery Officers and to local residents both whites and Indians, scattered over the basin, for much information of value.

As a result of the season's investigations I am of the opinion that more sockeye reached the upper section of the area of the Fraser this year than in any recent lean year, but in no district of the upper river were sockeye found in sufficient numbers to produce a future run of importance. The number of sockeye that reached the headwaters of the Harrison-Lillooet Lakes section, as will be shown later, was greater than in any previous year of which there is a record.

The number of sockeye that passed through Hell's Gate Canyon, above Yale, was unquestionably greater than in any recent lean year. Fishery Officer Scott, of the Dominion service, who has patrolled that canyon of the Fraser for a number of years, expressed the opinion that as many sockeye passed through Hell's Gate Canyon this year as in the last big year (1917). Sockeye in numbers reached the canyon early in July, more being in evidence there during that month than in many recent years; and they were in evidence there during August and September. Owing to unusually favourable water conditions throughout the year the fish at no time had any real difficulty in passing through the rapids at Hell's Gate. None were delayed there this year. The Indians, who have commonly fished for salmon at Hell's Gate, were not permitted to do so this year.

For the first time in many years sockeye were seen passing up the Thompson River between Lytton and Spences Bridge. Several Indians who caught sockeye from the Thompson in August

were arrested for doing so by Dominion officers. One of the Indians had caught upwards of 100 sockeye.

The sockeye that passed up the Thompson are believed to have spawned in the Shuswap-Adams Lake section, but an inspection of the principal tributaries of those lakes failed to disclose in any one of them sockeye in sufficient numbers to produce results of importance. Small numbers were, however, found in some of the tributaries where none have been reported for a number of years.

During July and throughout August and early September sockeye were observed passing through the canyon in the Fraser's channel above the mouth of Bridge River. The water there throughout the entire season was much higher than usual, with the result that the salmon had no difficulty in passing through the rapids. They were not delayed there this year. Notwithstanding the Dominion's order prohibiting the Indians from taking salmon above the commercial fishing limits at Mission Bridge, a considerable number of sockeye were taken by them in the canyon. As soon as their operations were reported to the Dominion fishery officials an officer was placed there, and thereafter all fishing ceased. The number of sockeye taken by the Indians could not be ascertained with any degree of certainty, but it is asserted that they caught more than in recent lean years when they were permitted to fish throughout the season.

Because the Indians living on the Chilcotin River were not permitted to fish for salmon, and because the waters of that river are always so discoloured by a chalky silt, it was impossible to establish the extent of the run of sockeye there this year. From statements made to me by Indians, who did fish in a small way at night, notwithstanding the prohibition, I concluded that sockeye ran up that river for at least two weeks in August. Indians living at the head of Chilko River, just below Chilko Lake, reported that more sockeye reached there this year than in any recent lean year, but that they were at no time so numerous as to have permitted their catching any considerable number had they been permitted to do so. The fish secured by them, like those taken by the Indians on the lower river, were consumed in a fresh state.

Less than 500 sockeye were recorded as entering Quesnel Lake this year. The watchman stationed there by the Department reports that the first sockeye reached there on September 2nd, and that the last to arrive passed through the fishway on September 17th. There was a scattered run between those dates.

The watchman at Quesnel Lake also reports that at least 400 spawning salmon passed through the fishway this year, a greater number than has been reported since the fishway was built by the Province in 1903.

The run of sockeye to the tributaries of the Nechako River, which enters the Fraser at Prince George and which drains Stuart and Fraser Lakes, was not sufficiently large to be of importance, but it is interesting to note that a few sockeye were reported from some minor streams in that section where their presence has not been recorded in recent years.

The number of sockeye that are known to have passed up the South Fork of the Fraser is small, though more are reported to have reached Bear Lake section than for some years.

The watchman stationed at Seton Lake reports that no sockeye, and very few other spawning salmon, entered that lake this year. The hatchery there was not operated.

The number of sockeye that reached the Birkenhead River, at the head of the Harrison-Lillooet Lakes section, this season was greater than in any year since that section came under our observation in the fall of 1902. Conditions there this year were most satisfactory and promised to produce a good return. The run of sockeye to this section in each of the last two years is believed to have been considerably greater than in any year since 1902. With the exception of the years 1917 and 1918, the run of sockeye to that section has shown no indication of diminishing. It is the only section in the entire watershed of the Fraser River basin, with the possible exception of Cultus Lake, that has not shown a steady and alarming decline in the run of sockeye. Year after year the run to the head of Lillooet Lake has been satisfactory, with the exception of the two years 1917 and 1918. Furthermore, the Lillooet Lake section is the only one in the Fraser basin, where hatchery operations have been conducted, in which the run of sockeye has been maintained. The number of sockeye that spawn in that section has not declined; on the contrary, there is evidence that it has increased. The question then naturally arises, why has the sockeye run to that section been maintained while the runs to all other sections have declined? The annual appearance of undiminished numbers of sockeye in the Lillooet Lake section must apparently be attributed to one of two causes: Either it is due

to the successful operation of the hatchery, or the races of sockeye that spawn there have not been subject to the great drain made on all the other races that spawn in the Fraser by the traps and nets on the fishing-grounds. Since it has not been shown that the sockeye that spawn in the Lillooet Lake section enter the Fraser before the fishing season opens on July 1st, it is not apparent why they should be less subject to the heavy drain by fishing than those that spawn in other sections. Fishing for sockeye in the Fraser before July 1st has not been permitted for over thirty years. It is a matter of record that when fishing for sockeye was permitted in May and June good catches were made in those months. Alex. Ewen, in the early days of the canning industry, packed as high as 10,000 sockeye in the month of May. Canning was not at that time extensively conducted, and those engaged in the industry found it more profitable to operate later in the season when the run was more extensive. There may still be runs of sockeye in May and June. The fact that sockeye have not been observed in the river at Hell's Gate until July does not prove that none enter the river much earlier, because earlier runs could easily pass into the tributaries of the Fraser below the canyon. Sockeye may still enter the Fraser in May or June and turn from the Fraser into the Harrison River en route to the waters of Lillooet Lake and the Birkenhead River. If such is the case it is obvious that such a run would not be subject to the drain of the traps and nets, and in consequence would easily maintain itself. It therefore becomes a matter of importance to establish when the runs to that section enter the Fraser. The Department hopes to do this during the coming year.

Sockeye reached the headwaters of Lillooet Lake and entered the Birkenhead River early in September. By the 17th of that month over 5,500,000 eggs had been collected and placed in the hatchery. The sockeye-egg collection for the season totalled 26,000,000. It is believed that many additional millions could have been secured had the operators desired to take them. They preferred, however, to let the fish spawn naturally. The weirs were therefore removed from the river and the fish permitted to pass to the natural spawning-beds of the Upper Birkenhead, which were abundantly seeded.

There were less sockeye in the lower reaches of the Fraser basin than in any recent year, and the egg collections for the hatcheries there were consequently much less than the average for that district. Owing to a smaller run and freshets the sockeye-egg collection for the hatchery at Harrison Lake totalled but 5,000,000, as against last year's take of 7,500,000. Owing to a very light run of sockeye to Cultus Lake but 1,250,000 eggs were secured, as against 10,500,000 collected last year.

I am indebted to Major J. A. Motherwell, Dominion Inspector of Fisheries for the Province, for the following statement, giving the salmon-egg collection made this year at all the hatcheries in the Province, which totalled 99,553,000:—

STATEMENT OF SALMON-EGGS COLLECTED, 1920.

Name of Hatchery.	Sockeye.	Cohoe.	Springs.	Chums.
Anderson Lake	10,142,450	.....	.....	.....
Babine Lake	5,000,000	.....	.....	.....
Cowichan Lake	.....	2,464,300	569,500	.....
Cultus Lake	1,171,000	880,000	.....	2,108,000
Kennedy Lake	9,577,500	.....	.....	.....
Harrison Lake	4,936,000	83,000	3,922,000	3,619,000
New Westminster	.....	205,000	100,000	.....
Pemberton	26,000,000	.....	.....	.....
Pitt Lake	4,360,500	234,000	.....	.....
Rivers Inlet	12,077,000	.....	.....	.....
Skeena River	7,734,000	.....	.....	.....
Stuart Lake	4,370,000	.....	.....	.....
Totals	85,368,450	3,866,300	4,591,500	5,727,000

Respectfully submitted.

JOHN PEASE BABCOCK,
Assistant to the Commissioner.

Victoria, B.C., December 15th, 1920.

THE SPAWNING-BEDS OF RIVERS INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

Sir,—I have the honour to submit my report upon the inspection of the spawning-beds conducted at Rivers Inlet for the year 1920.

Leaving Rivers Inlet Cannery on October 7th, I proceeded to the Owikeno Lake with the intention of going through to the head, but weather conditions compelled me to stop at Asklum River, situated 12 miles up, so commenced the inspection at this point first. The sockeye seen here were in great abundance, and as the river was low no difficulty was experienced in forming an accurate estimate of the run in comparison with the brood-years 1915 and 1916. The run was equal to 1915 and greatly exceeded that in 1916.

I wish to draw attention to a log-jam which has formed at the mouth, requiring removal at the earliest opportunity, as if permitted to remain it will cause a serious menace to future runs of fish up the river.

On arrival at the head of the lake camp was made and an examination conducted at Cheo River, one of the three tributaries situated at this point, all early-running salmon-streams. The numbers spawning on the beds right up to the falls, 4½ miles distant, equalled those seen there in 1915. Large numbers of fish in an advanced stage of spawning were observed just below the falls, having passed under the log-jam without difficulty; spawned-out salmon and dead bodies lying on the river-bed and the bars testified to the very large run which had prior to my visit come in. With the exception of the log-jam referred to, no other obstructions interfered with the movement up-stream.

The run of sockeye salmon to the Indian River shows a great improvement in comparison with the number seen on the beds in 1915 and 1916. The gravel-bars right up to the falls, half a mile distant, contained big numbers of spawning fish, while many were observed in a dying condition lying helpless on the bars; dead bodies covered the river-bed at the entrance, evidence that the run here earlier in the season had been exceptionally large.

An inspection of the Washwash River, on the extreme right of the lake, revealed conditions testifying only too plainly the necessity of continued effort each year to counteract the evil influence of the freshets, which have undone the good work of the Department of Fisheries to keep the spawning-beds open to the salmon. The clearance which the Dominion officials effected here in the spring of last year is again closed by a log-jam that blocks the entrance and will be a serious menace to future runs if attention is not given to it. This freshet continued its work of destruction by breaking through and opening up a new channel about a quarter of a mile from the entrance, laying bare all that portion of the river situated below, including the stream at the right of the Washwash. As it was in this part that a great proportion of the run last year had spawned, and which I had commented upon so favourably in my report, it is a matter that must be given due consideration in estimating the run which will return as the result of the 1919 spawning. If the freshet took place prior to the hatching of that year's brood, it will have had a corresponding effect upon the extent of the run. The course of the present channel is a scene of great chaos, huge trees having been felled and log-jams cover every portion, constituting a grave danger to the future run of salmon.

The number of sockeye in evidence in the Washwash this year was very gratifying; from the entrance to the falls, 3 miles distant, countless numbers were observed spawning on the beds, a large proportion having safely passed through the obstructions referred to above. The run approaches very closely the number seen on the beds in 1915 and greatly exceeded the run in 1916. In size the fish were again noted to be exceptionally large and to average much above the runs in recent years.

The number of spawned-out fish and dead bodies lying all over the bars approximated very closely in numbers to those seen on the beds of Cheo and Indian Rivers.

Sunday Creek, situated near the mouth of the Sheemahant flats, showed a great improvement in comparison with previous years; the gravel-beds at the entrance were covered with spawning sockeye of exceptionally large size, reminding me of the run of fish in 1915.

Numerous sockeye were breaking water in the Narrows, indicating that the spawning-beds at this section will receive a plentiful supply of eggs.

An examination of the Sheemahant River, the largest and one of the most productive salmon-streams of the lake, did not appear to have received so many sockeye as has been evidenced in other big years, but the run was very good and compared favourably with the number on the beds in 1915. At the entrance the fish were observed in considerable numbers scattered over the gravel-bars; as each riffle was encountered on our way up the river sockeye in large numbers were seen, while in the deep water below the fish could be detected hugging the banks, avoiding as much as possible the swift current. No log-jams or other obstructions interfered with the movement of the salmon up-stream.

On arriving at Jeneesee Creek I was informed by the hatchery officials that the Machmell River had broken through to this creek during a freshet and had carried away the trap and fence used by them for trapping the fish; the result was many had escaped capture before a new fence could be erected. It is from this creek that eggs for the hatchery have been collected in previous years, and it was hoped that some would be obtained this year, but the run was poor, only a very small number being obtained. An examination of the stream up to the falls was a great disappointment; few adult salmon were in evidence. A peculiar feature attached to this run is the abnormal number of small grilse that had entered, comprising 80 per cent. of the total number of fish on the spawning-beds; a few years ago these fish were looked upon with a degree of curiosity. A steady increase in the number each year for the past three or four years has been noted. I examined several to find the proportion of males and females, but they were all males. There is nothing to prevent the fish taking full advantage of the spawning-beds, as the clearance which was made in the spring of last year to open up these beds is still very effective. In making comparison with the number reaching here in 1915 and 1916, I find no improvement shown in the poor runs recorded for those years.

The Machmell River, as usual, constituted a difficulty in arriving at a proper estimate of the run of sockeye owing to the discoloration of the water, but in going farther up a few salmon were observed in the shallows, indicating that a certain number will seed the beds. As this river closely resembles the Sheemahant in size, it is a matter of regret that the full extent of the run cannot be determined.

The Nookins, a tributary to the Machmell, situated on the extreme right about half a mile from the entrance, was seen under favourable circumstances. In the still waters for about half a mile dead bodies of sockeye salmon covered the river-bed, testifying to a very big run earlier in the season. On reaching the rapids they were noted in large numbers spawning on the beds, and the farther we proceeded up-stream the greater the number seen. It represented a close parallel to the number recorded in 1915; the individual size was of high average and should produce a fine run of sockeye from this season's spawning.

The next river to receive attention was the Dalley, situated about 6 miles from the mouth of the lake. It is of peculiar interest, in that it represents an early-running salmon-stream although located so near the mouth of the lake. In the clear still waters above the rapids dead bodies were lying scattered all over the river-bed, having gradually drifted down-stream earlier in the season. As each successive riffle was encountered on our way through to the falls 4½ miles distant, the sockeye in an advanced spawning stage were observed in thousands on the gravel-beds, while the bars all the way up were covered with dead fish, from which the stench was overpowering. Here again the salmon represented a high average in size, comparing with those seen at the other tributaries of the lake. The high record attained in 1915 was again reproduced in the numbers that returned to spawn this year; the males and females were equally represented.

Crossing to Quap River, situated directly opposite the Dalley, the spawning-beds here were examined under very favourable circumstances. The surrounding waters of the lake were alive with jumping fish, and on close inspection sockeye in dense masses could be discerned in the deep pools waiting at the entrance; inside the entrance the same conditions were observed. The milling mass of sockeye is without precedent in all the years of my inspection, and is proof of the value of the hatchery in maintaining the runs year by year by the means adopted to liberate the fry into this river. If this could only be applied to the other tributaries of the lake there would be little fear of poor runs such as have taken place in recent years.

The spawning-beds up to the fence and beyond were covered with countless numbers of fish; here the Indians were catching salmon for their winter's use and had already smoked a great

number. It was their intention to put up about 3,000 salmon, so they informed me. Samples of the sockeye examined at random showed a very high average in size—viz., 8 to 9 lb. in weight.

Out of the full complement of sockeye-eggs received at the hatchery, I am courteously informed by W. J. Reid, Superintendent of the Dominion Hatchery, that 12,000,000 eggs were collected from Quap, 1,000,000 from the Hatchery Creek, and 500,000 from Jeneesee Creek. The failure of the latter is significant and bears out the poor reports recorded in 1915 and 1916, the brood-years from which the present run resulted.

As the high water which frequently occurs at the Hatchery Creek would not permit a fence to be erected right across, only part of it was undertaken, but even with this handicap a fair number had been collected, as will be noted from the above figures. The beds contained a large number of sockeye of exceptional size and in numbers compared very favourably with other years. The gravel-bars at the entrance also contained their proportion of sockeye, from the results of which the beds should be bountifully seeded.

The spawning-beds surrounding the rancheries and along the shore-line at the head of the Owikeno River were alive with fish jumping in every direction, testifying to a very big run to this section.

Spring salmon were again observed in large numbers occupying the spawning-beds of the Owikeno river, while many in the last stage of exhaustion and spawned out were seen at low tide lying on the beach near the mouth. Both cohoe and dog salmon were noted in exceptional numbers here, indicating that the beds will be extensively seeded from this species of salmon.

As a summary of the result of my inspection of all the tributaries of Owikeno Lake, which furnish the spawning-beds to the Rivers Inlet run of sockeye, I submit that all the tributaries were as well, if not better, stocked than in any year of record, and very much better stocked than in any year since 1915. Notwithstanding that the catch of sockeye at Rivers Inlet this year produced a pack of over 125,000 cases, sufficient fish escaped capture to adequately stock all the beds. The majority of the sockeye found there this year were exceptionally large and consisted of 5-year-old fish. Conditions on the beds this year were as satisfactory as in 1915, the brood-year of the 5-year-old fish that ran this year. It will be recalled that in 1915 I reported that the beds were better seeded than in any former year of record. The great run this year unquestionably is due to the exceptional seeding of 1915.

Another interesting feature is the exceptionally high average in size the run of sockeye attained this year.

In conclusion, I wish to express my appreciation for the kindness extended by G. L. Johnston, Manager of Rivers Inlet Cannery; W. J. Reid, Superintendent of the Dominion Hatchery, and his assistants, to whom I am indebted for a very successful trip.

I have, etc.,

Arthur W. Stone,

Fisheries Overseer.

Rivers Inlet, B.C., November 8th, 1920.

THE SPAWNING-BEDS OF SMITH INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit the following report of the inspection of the spawning-beds at Smith Inlet for the year 1920:—

Considerable interest was attached to this inspection, as it permitted me to observe for the first time the full effect that the withdrawal of the drag-seines had upon the run of sockeye salmon to the spawning-beds at Long Lake. Formerly the seines were operated at Qualla Creek, situated inside the gill-net boundary, and took toll of an immense number after they had escaped capture from the gill-nets distributed over the fishing-grounds at Smith Inlet.

It was long contended they were a serious menace to conservation, and if permitted to remain as a contributive factor to the salmon-pack would eventually work to the detriment of the salmon run each year; the Department of Dominion Fisheries, realizing the situation, took measures finally to counteract this danger by eliminating them from the fishing-grounds entirely, with the result that the fish are now permitted to reach the spawning-beds unmolested.

The effect of such a measure was clearly demonstrated by the substantial increase in the number that had reached the spawning-beds this year in comparison with the run in 1915, and greatly exceeded the run of 1916, the brood-years from which the present run resulted.

The low tides prevented access to the spawning-beds for a couple of days, so the opportunity was taken to examine the run of cohoe and dog salmon at the head of Smith Inlet; both species were in great abundance.

After accomplishing the ascent of the Docee River (the overflow to the lake) camp was made for the night. An examination of this river showed that the run of spring salmon had not fallen off in comparison with former years, but is well up to the average; in the clear water above the rapids they were seen in very large numbers and of exceptional size; many were also observed breaking water along the shore-line at the mouth of the lake. No cohoe salmon were in evidence at this time.

Proceeding to Quay Creek the next day, I was impressed by the considerable number of sockeye which were making full use of the gravel-beds at the entrance, and outside the fish could be seen breaking water in all directions. The restricted spawning-beds inside the creek were covered with spawning fish and at the foot of the falls many were making futile efforts to surmount them, but were hurled back helpless to die unspawned.

Last year I pointed out the disadvantage under which the fish laboured in finding suitable spawning-ground here, and suggested that if a fish-ladder could be constructed over the falls and the log-jams removed from the creek leading direct to a lake half a mile inland, some valuable spawning-beds could be opened up. I have no doubt if these measures were adopted it would add greatly to the value of this tributary as a contributing factor to the run of salmon.

The Delabah River, situated about 2 miles from the head of the lake, was exceptionally well stocked with sockeye and reminded me of the remarkable numbers recorded here in 1914; a considerable improvement was shown in comparison with the 1915 run, and is entirely due, I believe, to the steps taken to conserve the run of salmon to the spawning-beds this year. The river-bed from the entrance to the falls, 1½ miles distant, was literally covered with spawning fish; schooled up in the deeper parts thousands were seen waiting until ready to deposit the eggs; dead bodies lying on the river-bed and on the bars were observed in thick masses and created a most offensive odour. In the bay outside the sockeye were breaking water all over, and on close inspection could be detected in the clear waters of the lake schooled up in thousands, testifying to the exceptionally big run here. The outlook is exceedingly bright for a big return as the results of this season's spawning. A noticeable feature in connection with the run this year is the high average in size attained by the fish, and is in marked contrast to the runs which have returned in recent years.

The run of sockeye salmon to the fine spawning-beds of the Geluch River, situated at the head of the lake, exceeded the numbers recorded in 1915. The 3½ miles of spawning-ground ending at the falls was crowded with a seething mass of fish, while the inspection of the small mountain streams which empty into this river showed that the beds will receive their full proportion of salmon spawn from the very large number in evidence there. This situation is

only manifest during the years of the big runs, as on former occasions, when the run has been a small one, few salmon, if any, were seen in these streams.

No log-jams or other obstructions were encountered; consequently the fish were permitted to utilize every portion of the beds for spawning; the males and females were fairly evenly distributed.

The gravel-bars that cover the entrance to the Geluch and along the shore-line at the head of the lake contained their full quota of salmon, no falling-off being noted in comparison with other big years. In the surrounding waters of the lake salmon could be seen jumping in every direction.

Returning once more to the mouth of the lake, the Docee River was again closely inspected for signs of the Cohoe salmon, but none were in evidence.

In summing up the results of the inspection of this watershed, I am of the opinion that the improvement which is evident in the increased number of sockeye salmon on the spawning-beds is entirely due to the timely action of the Dominion authorities in preventing the operations of the drag-seines.

The size of the pack, amounting, I am reliably informed, to 20,000 cases this year, is in striking contrast to the big pack of 35,000 cases put up in 1915, one of the brood-years from which the present run resulted, and clearly demonstrates the value of conserving the run of fish to the spawning-beds.

The falling-off in the run of salmon to the spawning-beds in 1915, and mentioned in my report for that year, has, I am glad to say, been fully restored, and should result in a very big run of sockeye salmon to this section from this season's spawning.

In conclusion, I wish to express my appreciation for the courtesy extended by Mr. Blakey, caretaker of the Smith Inlet Cannery.

I have, etc.,

ARTHUR W. STONE,

Fisheries Overseer.

Rivers Inlet, B.C., November 8th, 1920.

THE SPAWNING-BEDS OF THE SKEENA RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In obedience to your instructions, I beg to submit the following report on the inspection of the spawning-beds of the Skeena River for the season 1920:—

I arrived at Donald's Landing, on Babine Lake, on September 4th, and proceeded the following day to 15-Mile Creek, where I met Mr. Karnock, the assistant to Mr. Crawford, of the Stuart Lake Hatchery. Mr. Karnock informed me that they had not commenced spawning in 15-Mile Creek, as they were then busy spawning in Pierre Creek, but they would do so later in an effort to get their full complement of eggs for the Stuart Lake Hatchery, a total of 6,500,000 eggs. At the time of my visit there were about 2,500,000 eggs in the baskets which had been spawned by Mr. Crawford in Pierre Creek, and he had gone back to Pierre Creek for as many more eggs as he could get without seriously interfering with the natural propagation in that creek. There were very few sockeye in 15-Mile Creek, and Mr. Karnock said it was much similar to that of 1916, which was one of the poorest years on record so far as the spawning-grounds are concerned. For about a quarter of a mile from the lake this creek is an ideal spawning-bed, but beyond that there is a succession of rock-obstructions and many waterfalls which prevent the salmon going farther up the creek. In average seasons this is considered one of the best spawning-creeks on Babine Lake, and I am informed that a hatchery with a 10,000,000-egg capacity will be built on this creek next year. A peculiar feature of this creek was the large number of undersized male sockeye in comparison with the others of average size, especially those that had gone through the fence or barricade erected for spawning purposes. A good many of these undersized sockeye, or "runts," as they are commonly called, would not exceed 10 inches in length. These "runts" are all males, but are not used for artificial spawning, although I am informed they give in proportion to their size as much milt as the average adult male. There were no Indians at the mouth of this creek catching or putting up fish, which was proof of the scarcity of the sockeye this year. As there is now an off-year in the cycle of the sockeye-run, it is evident that some restrictions will require to be imposed in the years 1924, 1928, and so on, during the sockeye-fishing season in order that the sockeye may regain the average of the other three years. Should a hatchery be built at this creek next year as is contemplated, it will increase the run considerably, especially to the upper end of the lake, and will offset the taking of the eggs for Stuart Lake Hatchery and planted in the Fraser.

I called in at 4-Mile Creek the same day, but this creek is too small to be of any importance, as one can jump across it almost anywhere. There was not a single live salmon in the creek, but I should judge a few sockeye had gone up a month earlier when the water was high, and since spawned, as was evident by the ten or twelve dead sockeye in the little pools in the creek.

The following morning I proceeded on to Beaver Creek, at the head of the lake, where there were two Stuart Lake Indian families fishing with nets near but not obstructing the mouth of the creek. While I was there the Indians overhauled their nets, but only caught two sockeye, although the nets had been out all night. Their smoke-houses and racks had a fair supply of fish, so evidently they had been more successful in catching salmon the previous three weeks. I went up Beaver Creek in a boat for a distance of about 3 miles. This creek for the first 3 miles has practically no current, is discoloured, and has a muddy bottom resembling a slough, making it almost impossible to see whether there are any sockeye in that particular stretch. On going farther up the creek I met with many log-jams and beaver-dams which would entail considerable expense to clear, but the current was more noticeable. A few sockeye were seen in the pools and gravel patches between the log-jams, but it was impossible to estimate the number owing to the darkness of the water.

It is apparent that only a limited number of sockeye can get over these obstructions while the water is high earlier in the season. A number of dead sockeye were seen between and above the log-jams, but as this creek is considered one of the earliest spawning-creeks in Babine Lake, there were evidently not a great number of sockeye successful in overcoming the obstacles. On returning to the mouth of the creek and patrolling round the head of the lake, there was only an occasional sockeye seen, although the head of the lake is considered a fine spawning-ground, the water being shallow for some distance from the shore with a fine sand and gravel bottom.

On September 7th I visited Pierre Creek and was agreeably surprised at the large number of sockeye seen. The creek had been cleared of all the big rocks and logs by Mr. Crawford, the Superintendent of Stuart Lake Hatchery, and was in splendid condition for spawning. I did not see Mr. Crawford here, but from the number of dead salmon near where the barricade had been I should judge that he had been successful in obtaining the majority of his complement of eggs for Stuart Lake Hatchery. Although there were a few undersized sockeye to be seen, the majority were of an average size and in good condition, the males and females being evenly balanced. In the lake around the mouth of the creek there were a large number of sockeye plainly seen spawning in the fine gravel and sand that had been washed down from the creek. This creek will be exceptionally well seeded, and to the knowledge of the hatchery and Dominion officials it will be far in excess of any previous year. There were no Indians at the mouth of this creek, so apparently there will be nothing to disturb the sockeye in their natural propagation. Pierre Creek is the earliest creek on Babine Lake for sockeye spawning, and I am informed by the Dominion Guardian that the first sockeye were seen in this creek on July 21st. From all reports the sockeye are running much later than last year, from no apparent reason unless it is attributed to the exceptionally high water in June and July.

On September 9th I arrived at Salmon or Hatchery Creek and proceeded up the creek to the hatchery, a distance of about 3 miles. This creek was also in fine shape, being free from any obstruction, with large numbers of sockeye clearly visible in the many big pools and many spawning in the numerous shallow gravel patches. The sockeye in this creek were of an exceptionally good size and should, in my opinion, average in the neighbourhood of 8 lb., a good many being nearer 11 lb. in weight. At the hatchery I met Mr. Gibbs, the Superintendent, who informed me that during the high water in July his barricades had been washed away and an unknown number of sockeye had escaped into Morrison Lake, at the head of the creek. This would naturally cause artificial spawning to be later than usual, as the ripe sockeye are generally found near the barricades. Mr. Gibbs did not expect to get as many eggs spawned as last year, but he thought that the number would not be much below the average of former years. There were a large number of sockeye jumping at and trying to get through the barricades, but sacks of hay all along the foot of the barricades prevented the fish from being injured when they fell back. In the creek the males and females were evenly balanced, but near the barricades the males predominated. Mr. Gibbs informed me that last year he spawned 8,760,000 eggs and commenced to liberate 7,924,000 young sockeye-fry in the month of May this year. Although this hatchery has a 10,000,000-egg capacity, Mr. Gibbs believes that better results are obtained with a less amount, as it allows more room for the young fry. This hatchery has been in operation for a good many years, and as proof of the results it is stated that in previous years the eggs for this hatchery were obtained entirely from Babine and other creeks; whereas, without exception, the eggs are now all obtained in this creek, and, incidentally, right at the door of the hatchery. The reason for this is the run is now changed, the fish, as is well known, returning to their place of origin. Illustrative of this point, I may say that while I was there ten or twelve sockeye had made their way through the intake-pipe into the hatchery and were spawning in the retaining pond. There were four Babine Indian families at the mouth of this creek and their smoke-houses and racks were fairly well filled.

On September 10th I arrived at Fort Babine and the following morning I went down the Babine River a distance of about 10 miles. It is on this stretch of water that the Babine Indians (approximately a hundred families) catch the bulk of their fish, and their smoke-houses and racks are scattered here and there along the shores. All their smoke-houses and racks had a good proportion of fish, but on questioning a few of the Indians as to the general run of the sockeye, they would say: "No fish." With the Indians it is either a case of lots of fish or no fish; they apparently never get a "fair" catch. There are good spawning-grounds in this stretch of water, especially near the bridge at Babine, but there were very few sockeye to be seen. In the vicinity of the old barricade-site on Babine River the Indians were catching a fair amount of spring salmon in addition to the sockeye. The following day, September 12th, I visited Fulton or Tachek Creek, where there were four Babine Indian families putting up their winter's supply of fish. Their smoke-houses and racks were also fairly well filled. On questioning these Indians as to the run of sockeye, they complained of not getting enough fish owing to the poor run. I went up the creek a considerable distance, and although there are fine spawning-beds for at least 2 miles there were very few sockeye to be seen. As this is the last point of interest on

Babine Lake, I may say that, with the exception of Pierre Creek and Hatchery Creek, the sockeye run in the Babine District was very poor, the number of sockeye on the spawning-beds being much below the average and on par with the year 1916. Hatchery Creek was well up to the average of former years and Pierre Creek better seeded than in any previous year.

I returned to Burns Lake and arrived in Hazelton on the 19th, and on the following day visited Awillgate Canyon, on the Bulkley River, where the Hazelton and Awillgate Indians catch their winter's supply of fish, chiefly by means of basket traps. The Indians do not now catch many fish at this point, as they are more industrious than the Babine Indians and do not make fish their sole winter food. Although there are a number of smoke-houses at the canyon, only two had been in use this summer. The Dominion Guardian at this point informed me that the water had been exceptionally high in July and it was impossible to estimate the run of sockeye. He was of the opinion, however, that the run was retarded by the high water and was below the average of former years.

I left Hazelton on September 21st and arrived at Lakelse Hatchery on the 23rd and there met Mr. Catt, the Superintendent. This is a new hatchery with a 10,000,000-egg capacity, and although the dwelling-houses are not yet completed the hatchery is in operation. The hatchery is situated on Granite Creek, about 2 miles from Lakelse Lake and almost at the other end of the lake, where the old hatchery was at the junction of Coldwater Creek and Lakelse River. Judging by the results Mr. Catt has obtained this year, the off-year of the cycle, the success of this hatchery is assured. At the time of my visit there were a little over 7,500,000 sockeye-eggs in the hatchery that had been spawned from Schallabuchan, Williams, and the branches of Granite Creek. Mr. Catt also had the regrettable experience of having his barricades washed away during the high water in July, and but for this loss of the early run of sockeye he could have obtained his full complement of sockeye-eggs. To make up his full complement, Mr. Catt has spawned 2,000,000 pinks and cohoes and he fully expects to have 8,000,000 sockeye-eggs by the time he is through spawning. The two principal sockeye-creeks on Lakelse Lake are Schallabuchan and Williams Creek, where the majority of the spawn is obtained.

Schallabuchan is a slow-running creek with a good sand and gravel bottom for some considerable distance from the lake. As this is the earliest-spawning creek in the lake, there were very few live sockeye to be seen, Mr. Catt informing me that he had commenced spawning here on August 1st.

Williams Creek is a big swift-running creek of great length which becomes broad and shallow near its mouth. The sockeye do not appear to go very far up the creek, preferring to spawn in the shallow sand and gravel patches near the lake. There were numbers to be seen spawning here, and also in the lake at the mouth of the creek, where spawning conditions are ideal. Granite Creek branches off below the hatchery in five different streams on its downward course to the lake. Each of the little streams is too small to be of any importance for spawning, although the sockeye try to make their way up. If Granite Creek was cleared of the rock and log obstructions below the hatchery it could be made to continue its way in one channel to the lake instead of five different streams as at present. This would enable the sockeye to go up the creek in large numbers and afford better protection from the bears that abound in this vicinity. All the sockeye seen were of average size and in good condition, and although Mr. Catt informed me that the males and females were evenly balanced at the beginning of the run, the males predominated towards the end of the run.

Blackwater Creek is quite close to Williams Creek, but although I went up this creek a considerable distance there were few live sockeye to be seen. This is also an early-spawning creek, but from the number of dead salmon seen it was poorly seeded and much below the average. On September 25th I visited Lakelse River and Coldwater Creek, which were both literally swarming with spawning pink salmon. Lakelse River is the only outlet of Lakelse Lake and joins the Skeena River some 12 miles distant. Sockeye do not spawn in Lakelse River, but go right through to the lake. There were a few spring salmon to be noted among the pinks in Coldwater Creek, but there was no evidence of any sockeye, and I am informed by Mr. Catt that the sockeye do not go up this creek.

In summing up the Lakelse spawning area, I may say that, with the exception of Williams Creek, which was near the average of other years, the spawning-beds will be sparsely seeded and below the average of previous years, although, from all reports, a little more hopeful than that of 1916.

As this was the last point of interest, I returned to Terrace and arrived in Port Essington on September 26th.

I wish to express my thanks to the Hatchery Superintendents and men, also Stuart Norrie, Dominion Fishery Overseer, to whom I am indebted for information supplied and hospitality shown.

I have, etc.,
R. GIBSON,
Fisheries Overseer.

Port Essington, B.C., October 1st, 1921.

THE SPAWNING-BEDS OF THE NASS RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit the following report in respect to conditions existing on the spawning-beds of the Meziadin watershed of the Nass River:—

I left the town of Stewart on September 15th with two Indian packers, and after a very strenuous journey owing to the inclemency of the weather—encountering heavy rain and snow when crossing the Bear River Glacier—we arrived at the head of Meziadin Lake in the evening of September 19th, where I was fortunate in being able to hire an Indian canoe, which saved the trouble of making rafts, to journey down the lake to the fishway.

On making an inspection of the upper part of the lake, I did not observe as many sockeye on the spawning-beds as in former years and there were not as many to be seen leaping in the lake. It will be recalled that the run of sockeye to the Meziadin Lake was very poor in 1919. Conditions there this year did not compare favourably even with 1919.

On the journey down the lake I inspected the Hanna River and McLeod Creek. Only a few sockeye were to be seen at the mouth of these streams.

After leaving the lake and entering its outlet, Meziadin River, we shot the McBride Rapids. Below these rapids are the principal spawning-grounds of spring salmon in the Meziadin Lake watershed. The run of spring salmon to this point must have been good this year, as there was evidence in abundance that these grounds were well seeded. The only bad feature of these spawning-grounds is the great number of enemies to the spawning salmon. The pools below these rapids simply abound with rainbow trout, Dolly Vardens, and a species of whitefish. We fished from the canoe for only a short while and landed seventy large rainbow trout and many whitefish and char. When thrown into the canoe they disgorged spring-salmon eggs in great numbers, which proves that they do an enormous amount of damage to the spring salmon. I have called attention to this matter in previous reports, and I again suggest that something should be done to try and lessen the number of these, the natural enemies of the salmon. From an angler's point of view I do not see that there could be any very serious objection, as this place is very difficult to get to and very rarely visited.

We arrived at the cabin at Meziadin Falls in the evening of September 21st.

On September 22nd and 23rd I made a thorough inspection of the river at both the upper and lower falls. There were a fair number of salmon congregated below the falls this season, one noticeable feature being the larger number of cohoe salmon than is usual to be observed there. The channel of the fishway is little changed from last year. The fish which enter it have no difficulty in passing through it. Numbers were passing through at the time of inspection. The condition within the fishway itself is much the same as reported upon last year. The Dominion Fisheries Department has done some temporary repairs, putting in a number of extra braces to hold up the crib-work, and has also removed some of the rubble-rock from the river at the entrance to the fishway. This temporary work should hold the bank and crib-work in place until some permanent work is done, provided it is not left too long. Quite a lot of rock has fallen into the three lower pockets, but this does not seem to interfere with the salmon going right through when once they enter the fishway. But the channel approaching the entrance is far from satisfactory, being partly obstructed with rubble-rock deposited there during the flood of 1917–18 and the high waters since then. Dominion Fishery Overseer Collison, with the means at his disposal, did some excellent work there this year, and the approach to the entrance is considerably better than it was last season, but, in my judgment, is still not entirely satisfactory and will not be until the old channel is fully restored.

During the great flood of 1917–18 a great mass of broken rock formed a reef in the channel between the main fall and the entrance to the fishway, that projects some yards below, and which diverts many salmon from the natural channel leading to the fishway. Many of the fish that approach the falls along the left bank of the river—their natural approach to the falls—are diverted from the channel leading to the fishway by the reef of rock mentioned. Many pass to the left of the reef and thence reach the water immediately below the fall. From that place they cannot enter the fishway or pass over the falls. This was evidenced by seeing some of the fish pass that way and by the fact that salmon were to be seen in all the waters just below

the fall and clear across the channel, more being assembled at the right side of the falls than at other points. Having worked their way over to that side, they did not appear to be working back again. It will be recalled that during the several years before the fishway was constructed it was demonstrated that almost the entire run of sockeye in the Meziadin River in approaching the falls passed up the channel close to the left bank of the stream, and that the channel there was the easiest and most direct approach to the falls, also that few fish passed up in the channel along the right bank. After the fishway was built it was demonstrated that the run continued up the left bank and passed without diversion into the fishway. The floods of 1917–18 deposited the rock that now constitutes the reef and also partly obstructed the channel leading to the fishway. The fish no longer are naturally led to the entrance, many, as stated, being diverted by the reef of rock. If this reef was partly removed and the rocks in the channel immediately below the fishway were entirely removed, former conditions would be restored. It is not, in my judgment, necessary to remove all of the reef. If a 10-foot opening is made in the reef at a point just below its union with the right wall of the fishway, the fish that are now diverted from the channel will pass from the foot of the fall into the fishway. It was noticed that the fish which reached that point rested there. If the opening suggested is made, the fish will be naturally drawn that way and thus reach the fishway. The rock constituting the reef is broken and can be easily removed.

The further removal of rock from the channel directly below the fishway and between the reef and the left bank of the falls is most desirable. I am very certain that conditions below the fishway can be made as satisfactory as they were before the damage caused by the big flood of 1917–18, and at comparatively small cost.

In Stewart I had a conversation with Dominion Fishery Officer Collison, who had just come in from a visit to Meziadin falls. He told me of conditions there. He informed me that when he arrived at the fishway he found that the entrance was practically cut off, and that he and his men cleared the channel as far as they were able at the time. Mr. Collison favours the building of an additional fishway on the right bank of the falls, and I understand that he is recommending its construction to the Department. There can be no doubt but that the construction of a fishway at that point would be a good thing for such fish as attempt to pass up on that side. The fish that now reach there cannot make the ascent of the falls on that side. But from what I know of conditions after the present fishway was constructed and up to the big flood of 1917–18, I am of the opinion that, if the changes are made below the entrance to the fishway which I have already suggested and which I understand Mr. Collison advocates in his report, all the sockeye, with few exceptions, that reach the falls will be able to ascend them and pass on up to the lake. Following the years that the fishway was in its original condition there certainly was no assembly of fish below the falls on the right bank.

It must be appreciated that it is most difficult to do any work at the falls, because they are most difficult of access. The trail over the Bear River Glacier has been virtually destroyed. There are now no bridges over Bear or Beaver Rivers or Surprise Creek. One cannot get in with pack-horses. Everything in the way of food and materials must be packed in on the backs of men. There are no residents, either Indians or whites. When the present fishway was built the trail from Redcliffe to Meziadin Lake was open, and the powder, cement, tools, and food for the men employed, which were all taken in, passed over the trail. Now everything has to be packed in by men over the glacier and down the lake, unless a seaplane is used. It is a difficult job to get in any considerable load. There is little chance that the old trail will be restored for some years to come.

Attached hereto find a set of photographs taken at the falls this year. They are not good owing to weather conditions.

We left the Meziadin Falls on the return journey on the morning of September 25th. On the way up the Meziadin River we were fortunate in seeing two fine moose. They took to the water and swam across to the opposite bank. On the night of September 26th we reached the cabin on the interior side of the Bear River Glacier. Here we were held up until the morning of the 28th on account of a heavy rain and snow-storm on the glacier, it being too dangerous to attempt to cross. We arrived back in Stewart in the evening of September 29th.

In making a summary of my trip of inspection, I am of the opinion that the run of sockeye to the Meziadin section of the Nass was not as large as in any former year of record, with the possible exception of 1919. The run of spring salmon was good, and there appeared to be a

greater number of cohoe salmon in this watershed than were found on my former inspection. I would once more like to emphasize the importance of getting rid of the natural enemies of the salmon at the particular place mentioned in my report—viz., foot of McBride Rapids. The trout are practically confined in a small area and a large number could be taken with a net or some other method.

I have, etc.,
C. P. HICKMAN,
Inspector of Fisheries.

WILL THERE BE A LARGE SOCKEYE RUN TO THE FRASER RIVER IN 1921?

BY DR. CHARLES H. GILBERT.

It may be assumed that any indication of the probable size of the sockeye-salmon run to the Fraser River in 1921 will be received at this time with lively interest. Fishermen and salmon-packers and all who are concerned with the salmon situation are aware that 1921 is a lineal descendant of those "big years" on the Fraser which, prior to 1917, occurred without fail in every fourth season, and brought such incredible hordes of salmon to the fishing-grounds and into the river. Even after the depletion of the river had become pronounced for the three "small years" of each cycle, still the quadrennial big years remained unimpaired. And they would probably have maintained themselves until now but for the accidental blockade of the Yale Canyon in 1913, precisely in time to intercept the spawning run of that big year.

The coincidence was most unfortunate. Had the blockade occurred a year earlier or a year later, comparatively little damage would have resulted. There would have been time to apprehend the seriousness of the situation, and to remove the barrier—as was subsequently done—before a big year should come round. But in 1913 the catastrophe had become irreparable before adequate measures of relief could be taken. The canyon was already full of struggling salmon destined for up-river spawning-grounds, trying in vain to force the blockade. Myriads of them subsequently weakened and died, still retaining their spawn, and they formed decaying masses on the bars and shores of the river below Hell's Gate. Thus the up-river spawning-grounds in 1913, for the first time in any big year, were left relatively bare of fish.

These facts were fully set forth by J. P. Babcock in the Report of the Commissioner of Fisheries of British Columbia for 1913, and their bearing on the unfavourable prospects for 1917 was plainly stated. As the season of 1917 approached interest in this problem became intense. The question was much debated whether the immemorial big year on the Fraser would again repeat itself, or whether the warnings of the experts would be justified in the event. Some of the packers took counsel of their hopes rather than their fears and made preparations for the usual pack of a big year. The result is still painfully fresh in our minds. By most strenuous exertions and an intensity of gleaning never before witnessed a pack of 560,000 cases was produced; little more than one-fifth the pack of the big year of the previous cycle.

Two entirely independent lines of evidence had pointed to a greatly decreased run in 1917. One of these we have already mentioned, based on the insufficient seeding of the up-river spawning-beds in 1913. The other method forms an interesting side-line of prophecy, which could not be developed in that cycle until 1916, the year before the season which so anxiously was being awaited. We shall proceed to discuss that second method more in detail, inasmuch as it is now equally applicable to the year 1921.

It is known to all packers and fishermen that the year before the big run was always made conspicuous by the occurrence of large numbers of greatly undersized individuals, which evidently constituted a class apart from the main body of the run, and in the small years of each cycle were rarely encountered. They were not only undersized, but they were all male fish, and their flesh was relatively pale in colour and poor in oil. Being thus of small value to the trade, they were not very welcome visitors. The canners who were jealous of the quality of their pack put them up separately as an inferior grade, and were thus in position to compare their abundance in the year of their occurrence with that four or eight or twelve years previously. From observations made in this manner, it came to be currently believed that whenever the number of small fish was relatively large, then the big year which followed would be correspondingly increased in comparison with other big years. It was believed that some basis for forecasting the size of the big run was furnished by the relative numbers of undersized sockeyes that were included in the run of the previous year.

The reason for such possible direct relation between the two became apparent in the course of our investigations of the ages of salmon. It then became known that whereas the usual run of sockeyes to the Fraser were maturing in the fourth year of their age, these undersized males —or *grilse*, as we call them—were maturing in their third year, and they would therefore make their appearance in the run one year earlier than would the 4-year fish which resulted from the same spawning. If then, the spawning of the last big year had been an unusually successful one, this might be expected to result in an exceptionally large run of grilse three years thereafter,

and an equally exceptional run of the 4-year fish which would constitute the big run of the following year. The number of 3-year grilse in the year before the big year might well, therefore, give a clue to the probable size of the big year itself.

Our investigations for the Provincial Fisheries Department of the Fraser River sockeyes began in 1911, and have permitted us but three opportunities to witness this run of grilse—in 1912, in 1916, and now during the last season, 1920. In the first of these, 1912, the big years were still undisturbed, for the grilse of that year had developed from eggs laid down in 1909, when the pack of sockeyes of the Fraser River had totalled over 1,500,000 cases. The 1912 grilse came from a successful season, and the proportion which they formed of the 1912 run could be accepted as an approximate statement for the corresponding years of previous cycles. Tests made throughout the season indicated that about one fish in five of the total run was a grilse. This condition in 1912 was followed in 1913 by a big year of the first magnitude, resulting in a pack of well over 2,000,000 cases.

It was with these data in our possession concerning the relation of grilse to big-year runs that we approached the season of 1916. The grilse that would run that year would have developed from eggs deposited in the year of the blockade in the Yale Canyon. Should they show a decided reduction in numbers compared with 1912, their condition would reinforce the argument from the impoverished spawning-beds of 1913, and a dismal outlook would be presented for 1917. It is a matter of record that the grilse of 1916 were only about one-fourth as numerous as in 1912, and it is equally a matter of record that the pack of 1917, compared with that of 1913, suffered an equal reduction.

For the year 1921 the same two lines of evidence are available—that derived from the condition of the spawning-grounds in 1917 and the independent evidence to be derived from the numbers of grilse that made their appearance in the run of 1920. As to the condition of the spawning-grounds, we have again the testimony of Mr. Babcock, and from this the prospect seems gloomy indeed. Not only was no improvement found over the conditions which had produced the curtailed run of 1917; the situation, on the contrary, had become definitely worse. The spawners throughout the up-river district seemed scarcely more numerous than in many of the lean years of past cycles and could be expected to produce nothing better in their turn.

Material to establish the numbers of grilse to be found in the run of 1920 was collected with great care under the supervision of Mr. Babcock. Collections of scales for age-determination, accompanied by data concerning the length and sex of the fish, were obtained at frequent intervals throughout the season. When the receipts of the cannery were small the entire catch was examined. At other times liberal samples were obtained, taken at random as the fish lay on the cannery floor. Secured in this manner, the 1,950 individuals which we have examined can be safely accepted as presenting a reliable cross-section of the entire run.

We have now, by microscopic examination of the scales, determined the ages represented in this complete series. In the early part of the investigation, as first tens, then hundreds of individuals passed under our observation without a single 3-year grilse appearing, it seemed that this group must be entirely absent from the run. But our 355th specimen, taken June 28th, proved to be a 3-year male; a second, the 515th fish to be investigated, appeared in the catch of July 5th; and a third, which had been taken August 16th, was the 1,666th sockeye of our series. Thus, in 1,950 sample sockeyes taken throughout the fishing season, but three grilse were included. In 1912 an equal number of samples contained approximately 200 grilse, and in 1916 an equal number, collected in the same manner, and including the entire run, contained 63 grilse.

In so far, then, as the number of grilse can be considered an index of the size of the run in the following year, the evidence from the 1920 run wholly agrees with that derived by Mr. Babcock from the condition of the up-river spawning-beds of the Fraser in 1917. From both of these lines of evidence the conclusion is forced upon us that 1921 will range itself definitely with the lean years of the Fraser, which for the three years of the previous cycle produced an average pack for each year of 265,000 cases, and for the corresponding three years of the present cycle an average pack each year of 90,000 cases.

The "big year" of the Fraser River, it seems, must now be reckoned wholly a thing of the past. Any methods which might be successful in re-establishing it would be equally successful in raising the traditional lean years of the Fraser from their present low estate to an equality with the old-time "big years," when untold millions of spawning sockeyes fought their way through the rapids of the Yale Canyon and distributed themselves over the unequalled spawning areas of the upper river.

PACK OF BRITISH COLUMBIA SALMON, SEASON 1920.

Compiled from Data furnished the Department by the B.C. Salmon Canners' Association.

Names.	Sockeyes.	Red Springs.	Pink and White Springs.	Bluebacks and Steelheads	Cohoes.	Pinks.	Chums.	Grand Totals (Cases.)
Fraser River District—								
B.C. Packers' Association	21,555	9,816	3,509	3,867	7,261	101	1,186	47,293
J. H. Todd & Sons, Fraser River	4,081	1,348	71	99	5,427	.....	3	11,029
Gosse-Millerd Packing Co., Ltd.	4,802	1,414	708	20	2,078	3	1,829	10,854
M. DesBrisay & Co.	1,463	364	73	.....	79	.....	11	1,990
St. Mungo Canning Co., Ltd.	2,425	1,729	.....	.....	3,477	.....	815	8,446
Great West Packing Co., Ltd.	4,205	1,520	33	368	1,985	.....	115	8,226
Glen Rose Canning Co., Ltd.	4,051	2,439	.....	.....	1,897	.....	413	8,800
Canadian Fishing Co., Ltd.	2,016	1,061	.....	168	730	12,735	19,512	36,222
J. H. Todd & Sons (Esquimalt)	2,247	.....	.....	.....	.....	.....	.....	2,247
Sooke Harbour Fg. & Pk. Co., Ltd.	1,554	.....	.....	.....	.....	.....	.....	1,554
Totals.	48,399	19,691	4,432	4,522	22,934	12,839	23,884	136,661
Skeena River District—								
B.C. Packers' Association	15,388	13,245	1,096	205	5,543	36,990	265	72,732
Anglo B.C. Packing Co., Ltd.	11,897	3,708	1,083	48	859	32,187	19	49,801
J. H. Todd & Sons	6,420	6,071	891	.....	6,051	11,093	.....	30,526
Kildala Packing Co., Ltd.	5,041	1,178	222	257	336	11,299	663	18,996
B.C. Canning Co., Ltd.	8,995	1,808	603	38	1,585	8,302	34	21,365
Northern B.C. Fisheries, Ltd.	8,042	3,343	319	341	1,596	15,404	5	29,050
Cassiar Packing Co., Ltd.	6,500	1,653	578	32	345	10,594	126	19,828
Wallace Fisheries, Ltd.	10,607	2,108	.....	.....	566	17,649	.....	31,230
Can. Fish & Cold Storage Co., Ltd.	6,078	2,734	345	.....	409	12,586	1,205	23,352
Gosse-Millerd Packing Co., Ltd.	9,222	1,106	140	259	742	18,265	1,418	31,161
Maritime Fisheries, Ltd.	874	449	40	38	36	3,310	99	4,846
Totals.	89,064	37,403	5,321	1,218	18,068	177,679	3,834	332,887
Rivers Inlet District—								
B.C. Packers' Association	33,489	123	33	.....	212	4,721	39	38,617
Anglo B.C. Packing Co., Ltd.	12,683	.....	82	.....	41	1,074	43	13,923
J. H. Todd & Sons	8,724	.....	12	.....	2,316	4,225	718	15,995
Provincial Canning Co., Ltd.	8,679	1,271	87	.....	271	3,519	57	13,884
B.C. Canning Co., Ltd.	15,428	24	21	.....	.....	1,884	.....	17,357
Kildala Packing Co., Ltd.	12,468	40	19	.....	22	1,356	8	13,913
Gosse-Millerd Packing Co., Ltd.	14,322	31	3	.....	8	2,422	79	16,865
Wallace Fisheries, Ltd.	13,255	33	14	.....	38	6,446	282	19,768
Northern Fisheries (Namu)	6,694	.....	.....	.....	.....	.....	.....	6,694
Totals	125,742	1,522	271	.....	2,908	25,647	1,226	157,522
Nass River District—								
B.C. Packers' Association	2,991	1,134	370	207	351	1,556	661	7,270
Anglo B.C. Packing Co., Ltd.	3,947	148	240	164	223	10,300	1,757	16,788
Northern B.C. Fisheries, Ltd.	3,722	2,075	510	126	1,227	12,341	3,213	23,214
M. DesBrisay & Co.	3,974	199	.....	.....	1,620	15,171	5,287	26,251
Western Salmon Packers, Ltd.	2,106	30	151	63	279	3,774	1,227	7,630
Totals	16,740	3,586	1,271	560	3,700	43,151	12,145	81,153
Vancouver Island District—								
J. H. Todd & Sons	.....	4,517	2,178	.....	4,435	51	2,910	14,091
Wallace Fisheries, Ltd.	462	3,697	3	.....	2,005	24	.....	6,191
Quathiaski Canning Co., Ltd.	785	482	60	.....	4,195	8,115	5,551	19,188
Clayoquot Sound Canning Co., Ltd.	4,711	1,481	138	.....	469	.....	1,572	8,371
Redonda Can. & Cold Stor. Co., Ltd.	15	165	.....	435	186	1,357	28	2,186
Nootka Packing Co., Ltd.	.....	7,539	551	.....	2,283	.....	196	10,569
Gosse-Millerd Packing. Co., Ltd.	.....	6,689	505	.....	781	.....	137	8,112
Sooke Harbour Fg. & Pk. Co., Ltd.	.....	1,072	96	....	2,449	69	1,525	5,211
Western Packers, Ltd.	1,014	38	.....	.....	3,752	4,775	672	10,251
Totals	6,987	25,680	3,531	435	20,555	14,391	12,591	84,170
Outlying Districts—								
B.C. Packers' Association	22,802	2,527	2,785	3,208	12,180	28,500	855	72,857
Anglo B.C. Packing Co., Ltd.	1,888	972	2,928	.....	4,985	27,508	133	38,414
Gosse-Millerd Packing Co., Ltd.	3,116	606	5	21	3,984	32,365	18,017	58,303
Kildala Packing Co., Ltd.	3,207	411	218	186	140	7,078	1,641	12,881
Wallace Fisheries, Ltd.	7,211	30	.....	.....	79	53,154	.....	60,474
Northern B.C. Fisheries, Ltd.	5,336	1,161	991	306	5,713	58,314	4,078	75,899
Western Packers, Ltd.	20,913	15	.....	.....	1,953	14,956	5,815	43,652
Maritime Fisheries, Ltd.	.....	1,524	143	.....	.....	12,584	358	14,609
Preston Packing Co., Ltd.	.....	855	462	.....	4,773	12,690	49	18,829
Totals	64,473	8,101	7,532	3,721	33,807	247,149	30,946	395,223
Grand Totals	351,405	95,983	22,318	10,456	101,972	520,856	84,626	1,187,616

STATEMENTS SHOWING THE SALMON-PACK OF THE PROVINCE, BY DISTRICTS AND SPECIES, FROM 1905 TO 1920, INCLUSIVE.

FRASER RIVER.

	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.
Sockeyes	48,399	38,854	19,697	148,164	32,146	91,130	198,183	719,796	123,879	58,487	150,432	585,435	74,574	59,815	183,007	837,489
Springs, Red	10,691	14,519	15,192	10,197	17,673	23,228	11,209	3,573	15,856	7,028	1,018	1,428	1,903	3,448	7,523	5,507
Springs, White	4,432	4,296	24,853	18,916	11,430	5,392	15,300	49	9,826	6,751	8,925	.....	2,263	557	.....	.....
Chums	23,884	15,718	86,215	59,973	30,934	18,919	74,826	22,220	12,997	47,237	52,460	8,687	415	63,530	15,543	3,304
Pinks	12,839	39,363	18,388	134.442	840	138,305	6,272	20,773	574	142,101	128					
Cohoes	22,934	39,253	40,111	25,895	31,330	43,514	43,504	16,018	36,190	39,740	35,031	27,919	33,270	35,766	34,413	30,836
Steelhead Trout	34	328	4,395	4,951	3,129	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Backs	4,488	15,613	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	136,661	167,944	208,857	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486	877,136

SKEENA RIVER.

Sockeyes	89,364	184,945	123,322	65,760	60,293	116,533	130,166	52,927	92,498	131,066	187,246	87,901	139,846	108,413	86,384	84,717
Springs	37,403	25,941	22,931	16,285	20,933	15,273	11,740	26,436	23,833	17,942	9,785	12,469	13,842	10,378	20,138	14,598
Chums	3,334	31,457	22,573	21,516	17,121	5,769	8,329	.....	504	70	....	28,120	45,404	25,217	38,991	7,523
Pinks	177,679	117,303	161,727	148,319	73,029	107,573	71,021	66,045	97,588	81,956	13,473					
Cohoes	18,068	36,559	38,759	38,456	47,409	32,190	16,378	18,647	39,335	23,376	11,531	12,249	10,085	15,247	16,897	7,247
Steelhead Trout	1,218	2,672	4,994	1,883	3,743	1,798	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	332,887	398,877	374,306	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420	114,085

RIVERS INLET.

Sockeyes	125,742	56,258	53,401	61,195	44,936	130,355	89,890	61,745	112,884	88,763	126,921	89,027	64,652	87,874	122,631	82,771
Springs	1,793	1,442	1,409	817	1,422	1,022	566	594	1,149	317	383	587	454	450	181	351
Chums	1,226	7,089	6,729	16,101	20,144	5,387	5,023	.....	3,845	288	.....	.....	.....	.....	.....	.....
Pinks	25,647	6,538	29,542	8,065	3,567	2,964	5,784	2,097	8,809	5,411	19	.....	479	700	.....	.....
Cohoes	2,908	9,038	12,074	9,124	15,314	7,115	7,789	3,660	11,010	6,287	2,075	1,400	9,505	5,040	66	.....
Totals	133,248	80,367	103,155	95,302	85,383	146,838	109,052	68,096	137,697	101,066	129,398	91,014	75,090	94,064	122,878	83,122

NASS RIVER.

Sockeyes	16,740	28,259	21,816	22,188	31,411	39,349	31,327	23,574	36,037	37,327	30,810	28,246	27,584	17,813	22,166	24,462
Springs	4,857	3,574	4,152	4,496	3,845	3,701	3,385	3,151	6,936	3,759	1,239	2,337	3,263	1,288	921	3,340
Chums	12,145	24,041	40,368	24,938	11,200	11,076	25,569	2,987	3,245	5,189	351	3,589	.....	.....	.....	.....
Pinks	43,151	29,949	59,206	44,568	59,593	34,879	25,333	20,539	12,476	11,467	895	.....	6,612	5,957	3,450	1,840
Cohoes	3,700	10,900	17,061	22,180	19,139	15,171	9,276	3,172	12,468	7,942	6,285	6,818	8,348	6,093	5,997	3,083
Steelhead Trout	560	789	1,305	1,125	1,498	113	.....	.....	.....	.....	140	....	1,101	681	.....	.....
Totals	81,153	97,512	143,908	119,495	126,686	104,289	94,390	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534	32,725

Vancouver Island Districts.*

	1920.	1919.	1918.	1917.
Sockeyes	6,987	6,452	6,143	9,639
Springs	29,211	36,013	29,324	19,509
Chums	12,591	128,013	251,266	240,381
Pinks	14,391	43,186	57,035	49,156
Cohoes	20,555	53,629	40,752	31,733
Totals	74,170	267,293	389,815	325,723

Outlying Districts.

	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.
Sockeyes	64,473	54,677	51,980	32,902	45,373	98,600	87,130	149,336	79,464	67,866	70,506	49,832	48,367	40,159	45,481	51,224
Springs	15,633	14,766	8,582	6,056	11,423	9,488	7,108	7,246	22,837	12,659	7,439	2,196	6,439	9,977	3,581	4,563
Chums	30,946	165,717	90,464	112,364	160,812	40,849	70,727	52,758	37,734	39,167	5,551	.....	.....	.....	.....	.....
Pinks	247,149	110,300	201,847	112,209	143,615	83,626	111,930	83,430	128,296	64,312	20,098	6,148	23,538	23,300	7,964	1,303
Cohoes	33,807	35,011	42,331	30,201	70,431	48,966	43,254	28,328	65,806	42,457	19,460	13,532	20,709	25,754	11,759	3,292
Steelhead Trout	3,721	702	1,009	865	712	985	.....	.. ...	.....	.....	.....	.....	36	2	.....	.....
Totals	395,728	381,163	404,793	294,597	432,366	313,894	320,168	285,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785	60,392

Total packed by Districts in 1905 to 1920, inclusive.

	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.
Fraser	136,661	167,944	210,851	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486	877,136
Skeena	332,787	398,877	374,216	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420	114,085
Rivers Inlet	157,522	80,367	103,155	95,302	85,383	146,838	109,052	68,096	137,697	101,066	129,398	91,014	75,090	94,064	122 878	83,122
Nass River	81,153	97,512	143,908	119,495	126,686	104,289	94,890	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534	32,725
*Vancouver Island	84,170	267,293	389,815	325,723	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Outlying Districts	395,223	381,163	404,793	294,597	432,366	313,894	320,169	285,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785	60,392
Grand totals	1,187,616	1,393,156	1,626,738	1,557,485	995,065	1,164,701	1,111,039	1,353,901	996,626	948,965	762,201	967,920	542,689	547,459	627,103	1,167,460

STATEMENTS SHOWING SALMON-PACK OF PUGET SOUND, BY SPECIES, FROM 1905 TO 1920.

	1920.	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.
Sockeyes	62,654	64,346	50,723	411,538	84,637	87,465	357,374	1,665,728	201,572	140,529	234,437	1,005,120	162,228	96,974	182,241	837,122
Cohoes	24,502	210,883	235,860	114,276	155,832	180,799	151,135	49,150	149,977	244,208	154,077	139,297	95,863	111,611	98,206	89,636
Puget Sound Pinks	4,669	421,215	6,605	1,121,884	1,887	589,780	909	788,789	708	1,038,136	.....	365,156	.....	448,730	.....	71,490
Chums	48,849	525,541	267,538	216,285	427,878	410,687	280,070	50,176	63,132	111,143	148,810	52,251	51,186	51,840	155,221	49,047
Totals	140,520	1,221,985	560,726	1,863,983	670,234	1,268,731	780,488	2,553,843	415,389	1,534,016	537,324	1,561,824	309,277	709,155	435,668	1,047,295

* Previously the Vancouver Island pack was shown in Outlying Districts pack.

FOURTH ANNUAL REPORT

OF

THE LAND SETTLEMENT BOARD

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE YEAR ENDING

DECEMBER 31ST, 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit for your consideration herewith the Annual Report of the Land Settlement Board for the year 1920.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., February 21st, 1921.

LAND SETTLEMENT BOARD OF BRITISH COLUMBIA,

VICTORIA, B.C., February 18th, 1921.

The Honourable E. D. Barrow,

Minister of Agriculture, Victoria, B.C.

SIR,—I have the honour to transmit herewith the Fourth Annual Report of the Land Settlement Board for the year ending December 31st, 1920.

I have the honour to be,

Sir,

Your obedient servant,

R. D. DAVIES,

Director.

Land Settlement Board of British Columbia.

Agricultural Loans.

During 1920 loan business decreased in volume as compared with previous years. This condition, while partly due to a falling-off in number of applications, was also caused to some extent by the preference given to applications for development purposes from new settlers as against applications for loans to discharge existing debts.

The amendments to the "Land Settlement and Development Act" passed during 1920 permit the making of loans on the progressive system and allow the allotment of moneys in such cases to be paid from time to time as specific improvements are completed.

While this type of loan has only been tried out in a small way, results appear to be satisfactory. The important feature of such a system is that moneys loaned in this way are secured for the making of specific improvements in such a way as to exactly fulfil the intention of the "Land Settlement and Development Act"—viz., the promotion of increased agricultural production.

As an instance of this system, over 100 settlers in the Development Area at Merville are working under a progressive-payment system. A similar system will be put into force in the Creston Area, in the case of any necessary assistance to settlers, after present development-work is complete.

The repayment of agricultural loans has been fairly regular. The majority of cases where payments are in arrears occur in districts where crop-shortage has been brought about through flood or other causes. Foreclosure proceedings have been taken in two cases during the past year where abandonment and serious neglect made such action necessary.

Settlement Areas.

During the year settlement-area work proceeded in the ten areas established during the previous year, according to the provisions of section 42 of the "Land Settlement and Development Act," whereby owners of selected unimproved lands in declared areas are required to commence improvements to such lands within a specified time, failing which a penalty tax of 5 per cent. of the appraised value of such lands is levied in addition to all other taxation, the owners having the option to surrender such lands to the Board at the appraised price to sell to *bona-fide* settlers.

The total acreage included in settlement areas to date is 121,141 acres, of which 46,647 acres have been surrendered to the Board at a cost approximating $200,000; 19,156 acres have been resold to *bona-fide* settlers, including fifty-three returned British Columbia soldiers, each of whom was allowed the statutory rebate of $500 on the purchase price of lands selected.

The following table shows the present situation in the various areas:—

Area.	District.	Total Acreage.	Acquired.	Sold.	Available for Sale.
1	Telkwa	17,214	5,484	4,719	765
2	Vanderhoof	35,358	13,730	6,970	6,760
4	Marten Lake	14,268	3,872	1,617	2,255
5	Prince George	18,663	11,601	4,160	7,441
6	Smithers	5,310	1,368	466	902
7	Rose Lake	6,521	1,582	....	1,582
8	Alexandria	3,311	1,625	....	1,625
9	10-Mile Lake	4,875	4,058	....	4,058
10	Francois Lake	15,621	3,327	1,223	2,104
	Total all areas	121,141	46,647	19,155	27,492

As an indication of the results attending the settlement-area system, all lands to which title was acquired in Area No. 1, Telkwa District, the first area to be established, have been sold to *bona-fide* settlers, while more than one-half of the lands available in Area No. 2, Vanderhoof District, have also been sold. In Area No. 5, Prince George, the only other large area

established by the Board, 11,601 acres have been acquired out of a total of 18,663. Although this area was only recently established, 4,160 acres have been sold to twenty-six new settlers, while 1,040 acres were improved privately to escape the penalty tax. A considerable number of applications for land in this and other areas at present are under consideration by the Board's representatives.

The indirect effect of the Board's operations is, perhaps, even greater than the results detailed above, as many private owners and land companies are now selling their holdings at reduced prices in order to conform with the invariably reasonable valuations placed on similar lands by the Board's Appraisers. Lands improved privately to escape the penalty tax in Areas 1 and 2 during 1919–20 total 10,927 acres, making, with the Board's settlers, a total of 37,466 acres under improvement, as against 14,850 acres before these two areas were established. It may therefore be said that the settlement-area policy, wherever put into force, has had a decided tendency to stimulate sales and to regulate prices.

Assessment of penalty tax for non-improvement amounts to $15,670 to date. This amount will be materially increased when full returns from inspection of areas during the year are received.

In conjunction with land-settlement work proper, stock has been supplied to new settlers and established farmers in several of the newer districts in the Province, under the "Cattle Club" system, by which plan not less than six farmers may make a joint application for the supply of selected live stock by the Land Settlement Board, repayment being spread over a period of three years. Up to date over 1,000 head of grade stock have been supplied under this system.

General assistance has been given by the Board's representatives to settlers outside established areas. Following the supply of dairy stock, assistance has been given in the construction of silos, and in co-operation with the Agricultural Department creameries have been established at Vanderhoof and Quesnel in order to ensure a ready local market for dairy produce.

DEVELOPMENT AREAS.

During the early part of 1920 the small development areas in the Fernie and Kelowna Districts were closed as such. In the former case the area was subdivided and thrown open for settlement under regulations provided for the sale of land in settlement areas. In the case of the Kelowna Area, delay to the securing of irrigation rights for the whole area adequate to a system of subdivision for intensive farming necessitated the postponement of development operations until more complete provision could be made for the irrigation of all subdivided acreage.

In the Merville Area development operations on a pay-roll basis were terminated during May of the past year, following which allotment was made of all lands subdivided, totalling 126 farm units, averaging, exclusive of small allotments, between 50 and 60 acres each.

Development-work is now proceeding under a system of progressive payments, by which each settler may, if necessary, secure assistance each month to an amount not exceeding 60 per cent. of the estimated value of actual improvements completed during the month. Assistance is also given in purchases of stock, implements, and seed for settlers.

In many cases settlers at Merville are able to undertake and finance improvements without assistance. Between fifty and sixty head of dairy stock were purchased during the autumn, returns from which have been a substantial help to settlers. During the coming season, with the increase of feed available from lots seeded down in 1919, it is proposed to increase the number of stock and to enable, as far as possible, all settlers to become self-supporting. The erection of houses, barns, and fencing is being continued also under the progressive-payment system, a close supervision of all plans and work being exercised by the Board's Supervisor.

In the Camp Lister Area, near Creston, development operations have been continued during the year on a pay-roll and contract basis as being more suitable to conditions in that area. It is expected that improvements will be completed on all farms now allotted during the early part of the summer, when it is proposed to place all settlers in the area under a similar system to that now in use in the Merville Area, as described above.

To provide for the planting of fruit-trees on all farms in the Lister Area during the coming spring, orders have been placed with nursery firms in the Province. Planting will be done by the settlers under the supervision of the Department of Agriculture.

Coincidental with the change from actual control of all operations in these areas by the Land Settlement Board to the individual management of farms by settlers, arrangements have been completed to transfer to local management the general stores now operated by the Board.

Reference should be made to the strong community spirit which has developed in both the Merville and Lister Areas and to the determination to succeed shown by the settlers. In each area a committee of the settlers is elected to confer with representatives of the Land Settlement Board on all matters affecting relations between the Board and settlers and to investigate complaints. This arrangement has been productive of good results and has assisted materially in the settling of difficulties.

Although sharp differences of opinion have arisen from time to time between the settlers and those charged with administration, entailing considerable difficulty in the organization of development-work, a more friendly spirit now exists. These two communities are becoming firmly established and must now be regarded as permanent.

DYKING AND DRAINAGE.

Acting as Commissioners under the "Drainage, Dyking, and Development Act," the administration of the Sumas and West Nicomen Island Dyking Districts has been part of the work of the Land Settlement Board during the past year.

In the Sumas District, with the approval of the ratepayers, tenders were invited for the construction of dykes and other works necessary to the reclamation of approximately 32,000 acres of land underlying and adjoining Sumas Lake, according to the plan prepared by Mr. F. N. Sinclair, now Chief Engineer, Sumas Dyking District.

On April 29th the contract was signed with the Marsh Construction Company, of Vancouver, for this work. Unusual high-water conditions prevented the commencement of this work until late in the month of August, when excavation began on the McGillivray Creek interception ditch. Clearing of right-of-way for the dykes proceeded and in October excavation commenced on the Fraser River Dyke. Work on this dyke has progressed rapidly, 47,000 cubic yards of material having been placed by a single machine in one month, working two shifts of eight hours each. With the completion of the electric-power line now under construction, three additional dredges which are now available will commence work on the main dykes.

In the West Nicomen Island Dyking District serious damage to the existing dyke occurred during the high-water period. Necessary repairs to all breaks are now under way and will be complete in the near future. In addition, a survey has been carried out by the Land Settlement Board looking to an improved system of protection of lands within this district and to provide for the inclusion of additional lands.

A small drainage project was brought to completion, known as the Cameron Drainage District, in the vicinity of Nanaimo.

Surveys were also completed and plans prepared for the drainage of an area adjacent to the town of Cranbrook, where 629 acres of arable land requiring drainage have been acquired by the Land Settlement Board.

AGRICULTURAL CREDIT COMMISSION.

REPORT OF LOAN APPLICATIONS FOR THE YEAR ENDING DECEMBER 31ST, 1920.

8 appraised (as at January 1st, 1920)		$13,250
Disposed of as follows:—		
8 rejected or withdrawn	$13,250	
19 unappraised (as at January 1st, 1920)		$14,200
Disposed of as follows:—		
3 awaiting appraisal (Peace River District)	$ 3,100	
16 cancelled or withdrawn	11,100	
Particulars of above—	$14,200	

No.	Amount.	Fee.
597	$1,500	$ 7 50
600	1,000	5 00
864	600	5 00
3	$3,100	$17 50

STATUS OF AGRICULTURAL CREDIT COMMISSION LOANS AS AT DECEMBER 31ST, 1920.

341 loans in force as at end of 1919 for		$693,250 00
42 loans granted during 1920 for		44,100 00
383		$737,350 00
4 loans cancelled or withdrawn	$ 4,300	
26 loans paid off	37,550	
30		41,850 00
353 loans in force at December 31st, 1920, for		$695,500 00
Less 2 mortgages foreclosed		3,500 00
16 loans granted, principal not yet paid		15,800 00
Amount still due to borrowers on same		14,311 65
Balance of loans as at December 31st, 1920—		
Principal	$609,540 42	
Interest	11,226 47	
		620,766 89

REVENUE AND EXPENDITURE ACCOUNTS FOR YEAR ENDING DECEMBER 31ST, 1920.

Expenditure.			Revenue.		
Proportion expenses, L.S.B.		$ 6,113 60	Appraisal fees received		$ 17 00
Exchange, discount, and commission		32 21	Legal fees		383 95
Postage and stationery		167 10	Interest—		
Trustee fees, legal		200 00	On loans	$41,017 31	
Depreciation, furniture and equipment (10 per cent. written off)		50 00	*Less* rebates	21 60	
				$40,995 71	
Interest on debentures		45,000 00	On Sinking Funds	9,178 90	
U.S. premium paid on interest coupons		5,070 04	On bank deposits	1,723 58	
Discount on debentures (1/25 written off)		6,112 00			51,898 19
			Discount on purchase of Victory Loan bonds		530 00
			Balance, being deficit for year carried to balance-sheet		9,915 81
		$62,744 95			$62,744 95

STATEMENT OF ASSETS AND LIABILITIES AS AT DECEMBER 31ST, 1920.

Assets.			Liabilities.		
Cash in bank—			Debentures due May 1st, 1941		$1,000,000 00
Current Account	$41,319 96		Appraisal fees unearned		17 50
Coupons Account	900 00		Coupons unpaid		900 00
		$ 42,219 96	Accrued interest on debentures		7,500 00
Discount on debenture sales		124,277 34	Accounts payable—		
Furniture and equipment		450 00	Sundry	$32,295 70	
Mortgages foreclosed		4,081 01	Registry Offices	94 90	
Loans on security of first mortgage		609,542 42			32,390 60
Interest outstanding on loans		11,226 47			
Accrued interest on loans		9,695 63			
Sinking Funds—					
Victory Loan bonds	$173,050 00				
Canadian Bank of Commerce	1 05				
Accrued interest on Victory Loan bonds	1,341 67				
		174,392 72			
Balance—					
Deficit as at Dec. 31st, 1919	$ 55,006 74				
Deficit for year ending Dec. 31st, 1920	9,915 81				
		64,922 55			
		$1,040,808 10			$1,040,808 10

Deficit, 1916	$19,015 32
„ 1917	22,200 92
„ 1918	6,045 57
„ 1919	7,744 93
„ 1920	9,915 81
Total deficit	$64,922 55

ACCRUED INTEREST ON VICTORY LOAN BONDS AS AT DECEMBER 31ST, 1920.

$119,750	from November 1st to December 31st at 5½ per cent	$1,100 72
53,300	from December 1st to 31st at 5½ per cent	240 95
$173,050		$1,341 67
	Less amount already credited	1,261 22
		$ 80 45

LAND SETTLEMENT BOARD.

REPORT OF LOAN APPLICATIONS AS AT DECEMBER 31ST, 1920.

1918 Applications.

6 appraised (as at January 1st, 1920)		$ 7,600 00
Disposed of as follows:—		
6 rejected	$ 7,600 00	
6 unappraised		9,700 00
Disposed of as follows:—		
4 cancelled or withdrawn	$ 7,200 00	
1 granted	2,000 00	
1 unappraised (Peace River District)	500 00	
	$ 9,700 00	

(No. 1723 for $500, fee $3.)

1919 Applications.

33 unappraised (as at January 1st, 1920)		$ 66,600 00
Disposed of as follows:—		
16 rejected or withdrawn	$ 38,850 00	
16 granted (for $24,050)	27,150 00	
1 unappraised (Peace River District)	600 00	
33	$66,600 00	

(No. 1956 for $600, fee $3.)

1920 Applications.

160 applications received for		$314,600 00
Disposed of as follows:—		
65 applications granted (for $88,650)	$113,450 00	
74 rejected	163,250 00	
5 appraised, action pending	7,750 00	
16 unappraised (fees $104)	30,150 00	
160	$314,600 00	

Unappraised—

No.	Amount.	Fees.
1973	$ 4,000 00	$ 9 00
1974	2,000 00	7 00
1975	1,500 00	7 00
1980	1,500 00	7 00
2041	1,500 00	7 00
2086	1,000 00	5 00
2088	2,000 00	7 00
2089	750 00	3 00
2094	1,000 00	7 00
2103	4,700 00	10 00
2106	1,500 00	7 00
2111	3,000 00	8 00
2112	2,500 00	7 00
2116	600 00	3 00
2119	600 00	3 00
2120	2,000 00	7 00
16	$30,150 00	$104 00

STATUS OF LAND SETTLEMENT BOARD LOANS AS AT DECEMBER 31ST, 1920.

277 loans in force as at end of 1919 for		$584,200 00
42 loans granted during 1920 for		71,440 00
319 loans granted for		$655,640 00
17 loans cancelled or withdrawn during 1920 for	$36,750 00	
18 loans paid off during 1920 for	22,050 00	
35 loans disposed of for		58,800 00
284 loans in force at December 31st, 1920, for		$596,840 00
6 loans granted, principal not yet paid		16,600 00
Amount still due to borrowers on same		16,166 70
Balance of loans as at December 31st, 1920—		
Principal	$538,100 97	
Interest	10,180 16	
		548,281 13

STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDING DECEMBER 31ST, 1920.

Expenditure.			Revenue.		
Salaries—			Appraisal fees		$ 983 00
Directors	$ 6,747 82		Exchange, discount, and commission		29 31
Office staff	13,092 80		Legal fees		31 56
		$ 19,840 62	Kelowna Office furniture-sale		5 00
Travelling expenses—			Interest—		
Directors	$ 4,088 25		On loans	$39,802 76	
Office staff	175 70		*Less* rebates	255 84	
		4,263 95		$39,546 92	
Office expenses—			Live-stock sales	2,650 68	
Stationery	$ 547 04		Land-sales	2,011 97	
Postage	400 00		Feed-sales	141 38	
Telegrams and telephone	243 41		Drainage and dyking works	4,228 67	
Sundry	133 51		Bank deposits	401 29	
		1,323 96			48,980 91
Interest on Treasury advances		110,157 86	Agricultural Credit Commission, proportion of operating expenses		6,113 60
Rebates on Returned Soldiers' land purchases		11,000 00	Balance, being deficit for year, carried to balance-sheet		96,736 85
Transfer of outstanding accounts		404 35			
General expenses—					
Appraisals	$ 293 20				
Live-stock purchases	25 00				
Advertising *re* silos	399 10				
Trip, Soldier Settlement Board officials	90 00				
Vanderhoof feed purchase	51 30				
Cranbrook Office	212 57				
		1,071 17			
Depreciation—					
Office furniture and equipment	$ 200 80				
Office alterations	73 40				
Telkwa furniture	28 00				
Vanderhoof furniture	20 00				
		322 20			
Motors—					
Vanderhoof car	$ 1,040 55				
Prince George car	653 08				
		1,693 63			
Cost of investigations written off—					
Sayward District lands	$ 494 50				
Pritchard lands	810 14				
Nitinat lands	34 95				
6-Mile Lake lands	274 60				
Beaver Valley lands	308 90				
Basque Ranch lands	661 45				
Burnaby lands	151 35				
Richlands investigation	66 60				
		2,802 49			
		$152,880 23			$152,880 23

STATEMENT OF ASSETS AND LIABILITIES AS AT DECEMBER 31ST, 1920.

Assets.

Cash and advances—		
Cash in bank	$ 882 22	
Advances to Directors and sub-offices for expenses	1,862 25	
		$ 2,744 47
Loans—		
Loans granted	$656,590 00	
Less amounts due to borrowers	108,308 87	
		548,281 13
Accrued interest—		
On loans	$ 8,905 62	
On live-stock sales	494 61	
On land-sales	1,411 74	
On feed-sales	141 38	
		10,953 35
Carried forward		$ 561,978 95

Brought forward			$ 561,978 95
Accounts receivable—			
Live-stock sales		$ 34,815 51	
Live-stock purchase		21 00	
Agricultural Credit Commission		30,869 56	
Feed-sales		8,743 09	
Sundry accounts		85 40	
			74,534 56
Land purchases and development—			
Area.	Purchase Price.	Development Costs.	
Courtenay	$ 69,699 91	$437,221 89	
Creston	187,431 46	286,195 81	
Creston timber	31,330 19	.....	
Kelowna (Christian Ranch)	33,070 50	24,665 97	
Fernie	10,256 65	24,572 57	
Telkwa	30,200 60	3,240 32	
Vanderhoof	72,672 07	7,815 23	
Marten Lake	16,735 17	1,450 06	
Prince George	55,643 21	2,602 61	
Lot 341, Range 5, Coast District	3,215 35	.....	
Cranbrook estates	4,741 99	735 10	
Smithers	5,318 40	1,042 25	
Rose Lake	23 01	890 41	
Alexandria	1,448 88	576 03	
Francois Lake	14,482 30	2,950 31	
10-Mile Lake	14,100 65	539 66	
	$550,370 34	$794,498 22	
		550,370 34	
			1,344,868 56
Investigations—			
Nazko River lands		$ 91 55	
Barrett Ranch		1,568 38	
Terrace lands		375 18	
Woodpecker Island lands		2,115 83	
Engen Block-Vanderhoof lands		440 58	
Bulkley-Forestdale lands		220 42	
Cariboo lands		1,383 77	
Palling lands		251 00	
Bulkley-Houston lands		185 55	
Bulkley-Telkwa lands		157 98	
Bulkley-Deep Creek lands		168 84	
Bulkley Valley lands		63 35	
Bulkley-Hazelton lands		427 41	
Bulkley-Doughty lands		41 03	
Elk Creek (drainage)		60 80	
			7,551 67
Dyking and drainage projects—			
Capital Account—			
Cameron drainage		$ 8,502 90	
Sumas Dyke		129,058 05	
Cherry Creek		1,577 48	
Langley Dyking District		543 65	
Maintenance Account—			
West Nicomen Dyke		8,355 93	
			148,038 01
Carried forward			$2,136,971 75

Brought forward		$2,136,971 75
Office furniture and equipment (*less* depreciation)—		
Victoria furniture	$ 1,458 00	
Victoria alterations	630 00	
Sub-offices	874 93	
Surveyors' and Directors' equipment	464 25	
		3,427 18
Motor-cars—		
Prince George	$ 700 00	
Vanderhoof	300 00	
		1,000 00
Stationery		400 00
Quesnel Creamery		6,333 78
Balance—		
Deficit as at December 31st, 1918	$ 16,731 67	
„ „ „ 1919	51,856 52	
„ „ „ 1920	96,736 85	
		165,325 04
		$2,313,457 75

Liabilities.

Loans—		
Provincial Treasury		$2,216,108 62
Accounts payable—		
Sundry	$ 2,773 10	
Development areas	22,612 27	
Medical-aid fees	817 40	
		26,202 77
Land-sales—		
Part Lot 341, Range 5, Coast District	$ 1,100 00	
Telkwa Area	21,182 03	
Vanderhoof Area	32,688 45	
Courtenay Area	639 06	
Marten Lake Area	2,521 92	
Prince George Area	10,147 90	
Smithers Area	212 00	
Francois Lake Area	1,191 60	
Fernie Area	1,353 40	
		71,036 36
Appraisal fees unearned		110 00
		$2,313,457 75

CAMERON DRAINAGE DISTRICTS.

Statement of Assets and Liabilities as at December 31st, 1920.

Assets.		Liabilities.	
Advertising	$ 40 60	Land Settlement Board	$8,502 90
Legal expenses	70 00		
Travelling expenses	71 25		
General expenses	93		
Engineering charges	896 42		
Construction charges	6,755 70		
Registration charges	58 25		
Interest on advances	523 77		
Interest accrued	85 98		
	$8,502 90		$8,502 90

SUMAS DYKE PROJECT.

Statement of Assets and Liabilities as at December 31st, 1920.

Assets.		Liabilities.	
Engineering	$ 40,615 03	Land Settlement Board	$129,058 05
Pay-roll	4,216 07		
Commissary Account	1,368 06		
Instruments and equipment	1,903 43		
Office supplies and expenses	651 52		
Buildings and equipment	4,213 46		
Construction Account	59,023 49		
Right-of-way purchase	377 52		
Old Commissioners' accounts	11,601 24		
Commissioners' expenses	144 55		
Power and light plant	591 08		
Administration	1,065 00		
Interest charges	3,287 60		
	$129,058 05		$129,058 05

WEST NICOMEN DYKE.

Reconciliation of Tax and Interest Account.

	Tax.	Interest.
1. Watson	$ 45 81	$ 16 30
2. Woodworth	383 71	154 23
3. „	169 88	69 63
10. „	236 48	89 99
14. Handy	118 37	42 84
16. „	352 30	134 16
20. Randall, C.	12 96	4 78
22A. Seymour, A.	116 94	38 90
27. Gourlay, J., Estate	308 70	97 60
31. McIntosh	152 70	55 09
34. Miller Bros.	18 33	.....
36. „	8 68	53
40. Gourlay, Thos.	548 63	170 93
41. Gourlay Estate	183 23	54 83
46. Clarke, Jane	68 16	26 65
49. Ross, Julia	528 11	197 30
53. Brown, Ada	164 30	61 38
66. Gibbs, S. M.	14 32	7 89
	$3,431 61	$1,223 03

Taxes, 1916	$1,876 40	
„ 1917	1,555 21	
	$3,431 61	
Interest	1,223 03	
	$4,654 64	

WEST NICOMEN DYKE.

Statement of Revenue and Expenditure as at December 31st, 1920.

Expenses.		Revenue.	
Engineering	$ 646 07	Interest, Bank deposits, etc.	$ 188 63
Solicitors' fees	56 00	Interest on arrears of taxes	1,865 70
Expenses, Commissioners	649 40	Balance, carried to Surplus Account	15,275 25
Administration salaries	720 00		
Expenses, sundry	324 51		
Maintenance charges	12,464 08		
Power	2,113 05		
Bonds, expenses new issue	356 47		
	$17,329 58		$17,329 58

Statement of Assets and Liabilities as at December 31st, 1920.

Assets.		Liabilities.		
Dyke Construction Account	$ 94,867 96	Debentures authorized	$90,000 00	
Sinking Fund—		*Less* unsold	3,000 00	
Mortgage investment	3,000 00			$ 87,000 00
Sundry charges	312 32	Land Settlement Board advances		8,355 93
Insurance premiums	51 00	Surplus Account	$28,805 74	
Sundry book debts	714 53	*Less* transfer from revenue	15,275 25	
Interest on debentures	5,220 00			13,530 49
Taxes for 1916 and previous	1,876 40			
Taxes for 1917	1,555 21			
Interest on overdue taxes	1,223 03			
Mr. MacLean, tax payments collected, not yet remitted	65 97			
	$108,886 42			$108,886 42

I hereby certify that the accompanying balance-sheets and revenue and expenditure statements are in agreement with the books of the Land Settlement Board (including the separate books of the Agricultural Credit Commission), and exhibit a true and fair statement of the financial position of the Board as at December 31st, 1920, and the result of the operations for the year ended that date.

A. N. MOUAT, C.A.,
Comptroller-General.

Victoria, B.C., February 16th, 1921.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF ATTORNEY-GENERAL

REPORT

OF THE

INSPECTOR OF MUNICIPALITIES

FOR THE YEAR ENDING

DECEMBER 31ST, 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to transmit herewith the Annual Report of the Inspector of Municipalities for the year ending December 31st, 1920.

All of which is respectfully submitted.

J. W. DE B. FARRIS,

Attorney-General.

Victoria, July 12th, 1921.

REPORT OF
INSPECTOR OF MUNICIPALITIES.

VICTORIA, B.C., July 12th, 1921.

Hon. J. W. de B. Farris,
Attorney-General.

SIR,—I submit herewith my statistical report of the financial affairs of the various municipalities of the Province as of December 31st, 1920, and including statements of assessment and tax levy, 1921.

The statements which I submit herewith are:—

I.—Assessments, 1921.
II.—Particulars of Tax Levy, 1921.
III.—Liabilities as of December 31st, 1920.
IV.—Sinking Funds as of December 31st, 1920.
V.—Arrears of Taxes.
VI.—Particulars of Receipts for the Year 1920.
VII.—Particulars of Expenditures for the Year, 1920.
VIII.—Particulars of the Amounts of the Various Tax Levies for the Year 1920.
IX.—Comparative Statement of the Receipts from Principal Sources of Revenue for the Years 1914 to 1920, inclusive.
X.—Comparative Statement of Expenditures on Streets, Fire, Administration of Justice, Public Health, and Council Salaries, 1914 to 1920, inclusive.
XI.—Particulars of Money By-laws certified during the Year 1920.
XII.—Financial Statement of Public Utilities for the Year 1920.

The assessed value of taxable land shows a reduction for the year 1921 of $14,361,763.67. The debenture debt of the municipalities as of December 31st, 1919, stood at $94,741,615.32, and at December 31st, 1920, $96,097,910.30, showing an increase of $1,256,294.98. The debenture issues certified during this period were $2,149,057.35. The total of arrears of taxes as of December 31st, 1920, is $8,248,455.61, which is to be compared with $12,094,121.37 at the end of the year 1919, and $14,631,216.65 at the end of 1918, the last mentioned being the highest point on record. The lands which are now held by the municipalities, and which were taken over through tax-sale proceedings, increased during the year 1920 from $3,385,871.04 to $5,247,788.34.

The receipts of taxes during the year 1920 were $15,467,662.57, as compared with $14,055,731.10 in the preceding year, and the total receipts, including receipts from public utilities, were $21,711,115.77, as compared with $18,815,692.09 in the preceding year. The gross expenditure increased to $17,696,022.84 to $20,686,963.59.

The condition of the sinking funds in some respects shows an improvement, but in the total the shortage is greater than at the close of the preceding year. At the close of 1919 the sinking fund shortage amounted to $5,289,012.15, and at the close of 1920 amounted to $5,591,425.14. The items which contributed chiefly to this result were an increase in the deficit of the City of Victoria amounting to $376,223.97 and the writing-off in South Vancouver of mortgages to the amount of $68,200. In a few cases the sinking fund investments have been to some extent inflated by purchasing bonds at a rate below par, and by immediately writing them up on the books of the municipality at par. The sinking fund investments are distributed as follows: Bonds, $8,075,175.40; mortgages, $156,956.98; municipal debentures, $5,183,332.09. Mortgages are no longer recognized as proper investments for sinking funds and these are being steadily reduced from year to year. The City of Vancouver has power to repurchase its own debentures as investment for sinking fund. Of the amount of municipal debentures held as shown above, the sum of $3,921,363.79 is held by the City of Vancouver. Those held by other municipalities of the Province are investments which are not permitted by Statute, and I regret that these have been increased during the past year.

ROBERT BAIRD,
Inspector of Municipalities.

I.—ASSESSMENTS, 1921.

Cities.

Municipality.	Value of Taxable Land.	Value of Taxable Improvements.	Total Taxable Property.	Land and Improvements exempt from Taxation.	Grand Total.	Percentage Improvements Taxed.	Population.	Area in Acres.
Alberni	$ 569,375 00	$ 252,350 00	$ 821,725 00	$ 278,590 00	$ 1,100,315 00	*Nil*	500	1,553
Armstrong	570,302 00	529,250 00	1,099,552 00	36,545 00	1,136,097 00	50	1,100	1,000
Chilliwack	824,285 00	954,250 00	1,778,535 00	218,950 00	1,997,485 00	20	2,000	1,040
Courtenay	547,837 00	302,250 00	850,087 00	14,100 00	864,187 00	50	770	800
Cranbrook	668,050 00	547,075 00	1,215,125 00	.....	1,215,125 00	50	3,000	200
Cumberland	117,440 00	249,080 00	366,520 00	58,100 00	424,620 00	50	1,500	40
Duncan	746,652 00	459,150 00	1,205,802 00	140,080 00	1,345,882 00	*Nil*	1,200	500
Enderby	368,749 00	340,770 00	709,519 00	146,505 00	856,024 00	50	970	655
Fernie	856,952 00	1,344,390 00	2,201,342 00	575,650 00	2,776,992 00	50	5,000	331
Grand Forks	529,600 00	567,050 00	1,096,650 00	569,220 00	1,665,870 00	50	2,000	1,697
Greenwood	152,995 00	236,760 00	389,755 00	132,655 00	522,410 00	33⅓	800	640
Kamloops	2,533,487 00	2,119,730 00	4,653,217 00	994,815 00	5,648,032 00	25	4,000	912
Kaslo	196,437 00	254,570 00	451,007 00	148,500 00	599,507 00	50	1,370	400
Kelowna	1,640,688 00	1,648,800 00	3,289,488 00	369,585 00	3,659,073 00	33⅓	2,650	1,281
Ladysmith	385,750 00	447,750 00	833,500 00	106,335 00	939,835 00	50	2,850	220
Merritt	560,075 00	536,251 00	1,096,326 00	159,309 00	1,255,635 00	*Nil*	1,800	1,615
Nanaimo	2,377,265 00	3,009,887 00	5,387,152 00	380,375 00	5,767,527 00	*Nil*	7,800	720
Nelson	1,838,939 00	2,681,130 00	4,520,069 00	658,860 00	5,178,929 00	50*	5,500	483
New Westminster	10,044,341 00	40,300 00	10,084,641 00	12,457,540 00	22,542,181 00	50	17,000	3,481
North Vancouver	8,745,974 40	3,878,467 16	12,624,441 56	1,894,604 00	14,519,045 56	*Nil*	8,100	2,750
Port Alberni	865,685 00	744,075 00	1,609,760 00	245,653 00	1,855,413 00	*Nil*	750	1,960
Port Coquitlam	2,806,436 00	650,575 00	3,457,011 00	1,187,914 00	4,644,925 00	*Nil*	1,200	6,200
Port Moody	1,591,445 00	887,035 00	2,478,480 00	241,227 02	2,719,707 02	*Nil*	2,000	3,000
Prince George	2,150,485 00	.....	2,150,485 00	.....	2,150,485 00	*Nil*	1,380	1,092
Prince Rupert	8,773,649 00	.....	8,773,649 00	2,167,267 00	10,940,916 00	*Nil*	4,000	2,240
Revelstoke	1,205,810 00	1,360,150 00	2,565,960 00	633,925 00	3,199,885 00	50	4,200	595
Rossland	526,451 00	593,285 00	1,119,736 00	651,135 00	1,770,871 00	50	3,600	1,920
Salmon Arm	473,224 00	350,020 00	823,244 00	74,605 00	897,849 00	50	750	520
Slocan	54,745 00	55,400 00	110,145 00	32,679 00	142,824 00	*Nil*	430	192
Trail	587,900 00	1,415,765 00	2,003,665 00	118,685 00	2,122,350 00	50	4,000	664
Vancouver	133,207,150 00	77,090,000 00	210,297,150 00	.....	210,297,150 00	50	125,000	10,784
Vernon	2,156,565 00	1,680,591 00	3,837,156 00	679,715 00	4,516,871 00	50	3,000	2,000
Victoria	45,232,286 00	26,067,550 00	71,299,836 00	10,961,350 00	82,261,186 00	*Nil*	39,500	4,637
Totals	$233,907,024 40	$131,293,706 16	$365,200,730 56	$36,334,473 02	$401,535,203 58	...	259,720	56,122

* For school purposes only.

Districts.

Municipality.	Value of Taxable Land.	Value of Taxable Improvements.	Total Taxable Property.	Land and Improvements exempt from Taxation.	Grand Total.	Percentage Improvements Taxed.	Population.	Area in Acres.
Burnaby	$ 12,976,775 00	$ 3,563,653 00	$ 16,540,428 00	$ 3,803,760 00	$ 20,344,188 00	*Nil*	9,680	21,500
Chilliwhack	3,041,510 00	970,150 00	4,011,660 00	.....	4,011,660 00	*Nil*	5,000	45,000
Coldstream	828,998 00	1,543,456 00	2,372,454 00	.....	2,372,454 00	*Nil*	325	17,000
Coquitlam	1,743,086 00	.....	1,743,086 00	661,224 50	2,404,310 50	*Nil*	1,200	37,120
Delta	5,703,602 00	997,105 00	6,700,707 00	69,100 00	6,769,807 00	50	3,500	42,000
Esquimalt	4,572,606 00	1,882,810 00	6,455,416 00	654,050 00	7,109,466 00	*Nil*	4,000	1,500
Fraser Mills	142,920 00	319,939 00	462,859 00	.....	462,859 00	50	900	390.46
Kent	964,263 15	.....	964,263 15	.....	964,263 15	*Nil*	750	47,360
Langley	2,270,917 00	2,158,268 00	4,429,185 00	60,472 00	4,489,657 00	50	2,500	75,907
Maple Ridge	1,948,960 00	1,809,650 00	3,758,610 00	50,440 00	3,809,050 00	50*	3,000	45,000
Matsqui	2,280,612 00	1,997,982 00	4,278,594 00	17,000 00	4,295,594 00	50†	2,000	54,145
Mission	899,901 00	1,676,773 00	2,576,674 00	48,986 00	2,625,660 00	50	2,500	52,000
North Cowichan	2,746,725 00	2,735,387 00	5,482,112 00	59,985 00	5,542,097 00	10	3,000	35,000
North Vancouver	5,825,031 00	2,565,210 00	8,390,241 00	2,514,999 00	10,905,240 00	*Nil*	3,080	48,000
Oak Bay	4,183,531 00	3,878,150 00	8,061,681 00	176,391 00	8,238,072 00	*Nil*	4,000	2,552
Peachland	293,030 00	204,450 00	497,480 00	35,210 00	532,690 00	50‡	600	3,520
Penticton	1,918,060 00	2,797,991 00	4,716,051 00	580,203 00	5,296,254 00	10	2,740	7,044
Pitt Meadows	1,121,540 00	250,815 00	1,372,355 00	2,100 00	1,374,455 00	50	300	14,000
Point Grey	19,892,028 74	13,372,080 12	33,264,108 86	509,966 00	33,774,074 86	*Nil*	9,800	12,000
Richmond	5,375,601 00	1,588,689 00	6,964,290 00	151,084 00	7,115,374 00	50	3,110	30,000
Saanich	10,779,985 00	4,744,940 00	15,524,925 00	563,276 00	16,088,201 00	*Nil*	8,700	45,000
Salmon Arm	922,962 00	855,520 00	1,778,482 00	.....	1,778,482 00	*Nil*	4,000	46,080
South Vancouver	13,702,855 53	10,704,125 00	24,407,280 53	3,347,142 88	27,754,423 41	50	37,000	9,200
Spallumcheen	2,029,240 00	577,060 00	2,606,300 00	240 00	2,606,540 00	*Nil*	3,000	65,000
Sumas	641,056 00	366,430 00	1,007,486 00	22,495 00	1,029,981 00	50	475	19,100
Summerland	1,348,307 00	1,924,580 00	3,272,887 00	163,892 00	3,436,779 00	*Nil*	1,600	13,000
Surrey	4,254,820 00	1,862,050 00	6,116,870 00	.....	6,116,870 00	*Nil*	5,500	76,000
West Vancouver	2,830,809 00	.....	2,830,809 00	478,258 00	3,309,067 00	*Nil*	1,400	24,320
Totals	$115,239,731 42	$ 65,347,563 12	$180,587,294 54	$13,970,274 38	$194,557,568 92	...	123,660	888,738.46
Cities forward	233,907,024 40	131,293,706 16	365,200,730 56	36,334,473 02	401,535,203 58	...	259,720	56,122
Cities and districts	$349,146,755 82	$196,641,269 28	$545,788,025 10	$50,304,747 40	$596,092,772 50	...	383,380	944,860.46

* For school purposes only.
† Taxes levied upon 50 per cent. of assessed value of improvements which exceed $8,000.
‡ Fire area only.

II.—TAX LEVY, 1921.—CITIES.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Alberni	20.0	6.0	14.0	40.0	30.0
Armstrong	15.0	9.0	8.0	32.0	29.0
Chilliwack	17.0	18.5	16.5	52.0	51.5
Courtenay	16.4	9.4	...	25.8	21.0
Cranbrook	10.9	18.1	16.0	45.0	50.0
Cumberland	20.0	19.0	...	39.0	39.0
Duncan	13.0	13.0	3.0	29.0	28.5
Enderby	12.0	16.0	10.0	38.0	38.0
Fernie	12.28	20.73	6.99	40.0	43.97
Grand Forks	8.0	13.0	16.0	37.0	30.0
Greenwood	6.0	19.0	39.0	64.0	64.0
Kamloops	...	12.5	27.5	40.0	42.0
Kaslo	15.31	22.1	1.59	39.0	39.0
Kelowna	13.911	14.567	11.522	40.0	37.5
Ladysmith	9.0	28.0	5.0	42.0	30.0
Merritt	10.0	12.0	15.0	37.0	35.0
Nanaimo	12.29	17.58	18.13	48.0	45.0
Nelson	13.25	17.5	13.25	44.0	40.0
New Westminster	2.0	12.0	22.0	36.0	36.0
North Vancouver	13.6	10.65	9.75	34.0	30.0
Port Alberni	12.6	3.8	23.6	40.0	38.0
Port Coquitlam	11.44	4.48	13.58	29.5	22.1
Port Moody	12.9	4.85	7.25	25.0	25.0
Prince George	12.25	9.25	16.0	37.5	25.0
Prince Rupert	19.99	5.845	4.985	30.82	25.1685
Revelstoke	12.0	16.0	7.0	35.0	31.0
Rossland	1.0	20.0	19.0	40.0	40.0
Salmon Arm	10.66	8.33	13.0	32.0	30.0
Slocan	20.0	17.0	10.0	47.0	37.0
Trail	20.0	12.9	5.7	38.6	39.4
Vancouver	14.686	8.103	8.877	31.666	31.666
Vernon	9.0	12.0	19.0	40.0	37.0
Victoria	6.46	10.15	12.39	29.0	26.0

DISTRICTS.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Burnaby	10.65 (27.12)	10.35 (10.38)	12.0 (12.5)	33.0 (50)	29.0 (48)
Chilliwhack	10.0	10.0	0.7	20.7	20.73
Coldstream	14.9	3.5	9.7	28.1	23.4
Coquitlam	8.0 (14)	3.0	3.0	14.0 (20)	11.9 (16.9)
Delta	7.5	2.75	4.25	14.5	13.0
Esquimalt	11.1	7.4	.....	18.5	17.0
Fraser Mills	9.0	.....	.....	9.0	9.0
Kent	8.0 (35)	8.0	.....	16.0 (43)	10.0 (35)
Langley	12.0 (42)	8.0	.....	20.0 (50)	19.0 (50)
Maple Ridge	16.0	7.0	.....	23.0	10.5 (49.5)
Matsqui	12.0 (25)	10.0	.....	22.0 (35)	17.0 (31)
Mission	20.0	13.0	.....	33.0	21.0 (55)
North Cowichan	13.5 (25)	4.5	1.0	19.0 (30.5)	8.0 (25)
North Vancouver	14.8	6.6	9.6	31.0	25.2
Oak Bay	11.98	15.02	4.25	31.25	25.0
Peachland	14.0	18.0	9.0	41.0	36.0
Penticton	20.0	19.0	5.5	44.5	46.0
Pitt Meadows	8.0 (25)	2.0	.....	10.0 (27)	10.0 (25)
Point Grey	10.6 (19.6)	7.4	18.0	36.0 (45)	32.0 (40)
Richmond	12.75	6.25	3.0	22.0	20.0
Saanich	6.52	8.40	5.08	20.0	20.0
Salmon Arm	10.0	10.5	5.0	25.5 (20)	25.25 (20)
South Vancouver	9.1 (17.7)	16.48	15.82	41.4 (50)	41.4 (50)
Spallumcheen	7.75	8.0	3.0	18.75	11.95
Sumas	15.0	7.0	.....	22.0	19.10
Summerland	12.0	16.0	15.0	43.0	45.0
Surrey	14.0 (30)	8.0	.....	22.0 (38)	21.0 (37)
West Vancouver	7.5	7.0	12.5	27.0	30.0

Bracketed amounts represent tax on wild land.

	Total Debenture Debt.	Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
A	$ 70,130 00	$ 895 97	$ 71,025 97
A	178,950 61	7,818 81	186,769 42
C	207,545 29	.....	207,545 29
C	90,500 00	5,025 85	95,525 85
C	396,351 70	16,722 41	413,074 11
C	.....	1,160 09	1,160 09
D	138,100 00	6,018 70	144,118 70
F	90,000 00	2,983 02	92,983 02
F	398,634 39	32,124 55	430,758 94
G	107,800 00	1,372 33	109,172 33
G	73,861 00	.....	73,861 00
H	1,226,350 00	4,990 66	1,231,340 66
H	48,000 00	.....	48,000 00
H	454,109 00	7,512 55	461,621 55
I	96,477 00	11,615 07	108,092 07
M	113,000 00	.....	113,000 00
M	1,046,524 87	24,970 59	1,071,495 46
M	669,633 23	24,561 63	694,194 86
N	5,952,462 84	768,196 32‡	6,720,659 16
N	3,013,724 00	366,893 28	3,380,617 28
P	236,500 00	3,223 81	239,723 81
P	474,000 00	102,141 18	576,141 18
P	173,300 00	124,973 16§	298,273 16
P	302,000 00	33,477 35	335,477 35
P	1,709,222 90	.....	1,709,222 90
R	625,951 13	22,500 00	648,451 13
R	169,500 00	8,372 24	177,872 24
S	137,000 00	156 35	137,156 35
S	4,200 00	227 43	4,427 43
T	236,200 00	2,181 62	238,381 62
V	35,616,646 89	1,973,631 33	37,590,278 22
V	887,763 28	9,734 56	897,497 84
V	18,305,571 64	1,511,503 83‖	19,817,075 47
	$73,250,009 77	$5,074,984 69	$ 78,324,994 46

B	$ 2,176,150 00	$ 200,443 78	$ 2,376,593 78
C	15,000 00	17,552 10	32,552 10
C	129,000 00	2,091 19	131,091 19
C	90,675 42	.....	90,675 42
D	376,217 39	1,810 00	378,027 39
F	418,500 00	4,000 00	422,500 00
H	.....	5,500 00	5,500 00
K	.....	12,388 67	12,388 67
L	.....	3,320 00	3,320 00
M	.....	4,577 74	4,577 74
M	2,000 00	10,000 00	12,000 00
M	.....	14,931 94	14,931 94
N	35,000 00	5,663 83	40,663 83
N	1,420,322 40	108,290 43	1,528,612 83
O	1,334,224 46	57,424 46	1,391,648 92
P	40,500 00	7,704 17	48,204 17
P	867,000 00	16,798 13	883,798 13
P	.....	2,637 42	2,637 42
R	5,971,118 84	87,135 90	6,058,254 74
R	775,921 50	18,108 38	794,029 88
S	1,071,679 31	798 68	1,072,477 99
S	2,500 00	3,401 92	5,901 92
S	6,776,165 21	1,383,657 52¶	8,159,822 73
S	93,226 00	.....	93,226 00
S	.....	1,095 35	1,095 35
S	457,500 00	2,134 98	459,634 98
S	.....	32,287 23	32,287 23
W	805,200 00	.....	805,200 00
	$22,857,900 53	$2,003,753 82	$ 24,861,654 35
	73,240,009 77	5,074,984 69	78,314,994 46
	$96,097,910 30	$7,078,738 51	$103,176,648 81

dy Steel Works, $100,000.

Municipality.	Debentures.										Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
	Schools.	Streets and Bridges.	Other Non-revenue Producing.	Waterworks.	Electric Light.	Sewers (Revenue-producing).	Other Revenue-producing.	Local Improvements.	Better Housing.	Total Debenture Debt.		
Alberni	.....	.....	$ 8,000 00	$ 52,130 00	$ 10,000 00	.....	.....	.....	.....	$ 70,130 00	$ 895 97	$ 71,025 97
Armstrong	$ 27,500 00	$ 12,100 61	19,100 00	41,000 00	79,250 00	.....	.....	.....	.....	178,950 61	7,818 81	186,769 42
Chilliwack	29,000 00	75,500 00	83,000 00	.....	.....	.....	.....	$ 20,045 29	.....	207,545 29	.....	207,545 29
Courtenay	30,000 00	.....	.....	.....	25,500 00	.....	.....	.....	$ 35,000 00	90,500 00	5,025 85	95,525 85
Cranbrook	26,463 65	17,277 00	142,683 75	149,927 30	60,000 00	.....	.....	.....	.....	396,351 70	16,722 41	413,074 11
Cumberland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,160 09	1,160 09
Duncan	21,000 00	10,000 00	14,000 00	25,000 00	65,000 00	.....	.....	3,100 00	.....	138,100 00	6,018 70	144,118 70
Enderby	27,500 00	.....	21,500 00	22,500 00	.....	.....	.....	18,500 00	.....	90,000 00	2,983 02	92,983 02
Fernie	45,000 00	5,000 00	84,000 00	119,000 00	74,000 00	$ 67,000 00	.....	4,634 39	.....	398,634 39	32,124 55	430,758 94
Grand Forks	6,500 00	8,000 00	62,500 00	30,800 00	.....	.....	.....	.....	.....	107,800 00	1,372 33	109,172 33
Greenwood	.....	19,960 00	18,034 00	35,867 00	.....	.....	.....	.....	.....	73,861 00	.....	73,861 00
Kamloops	63,500 00	15,000 00	116,500 00	304,000 00	205,500 00	60,000 00	$ 345,000 00	57,650 00	59,200 00	1,226,350 00	4,990 66	1,231,340 66
Kaslo	15,500 00	.....	.....	1,500 00	31,000 00	.....	.....	.....	.....	48,000 00	.....	48,000 00
Kelowna	61,500 00	15,500 00	144,500 00	.....	.....	.....	155,500 00*	51,309 00	25,800 00	454,109 00	7,512 55	461,621 55
Ladysmith	.....	.....	.....	.....	25,000 00	60,000 00	.....	11,477 00	.....	96,477 00	11,615 07	108,092 07
Merritt	13,000 00	10,000 00	20,000 00	45,000 00	25,000 00	.....	.....	.....	.....	113,000 00	.....	113,000 00
Nanaimo	50,000 00	55,000 00	36,000 00	330,500 00	.....	220,000 00	.....	325,024 87	30,000 00	1,046,524 87	24,970 59	1,071,495 46
Nelson	75,000 00	40,000 00	50,000 00	22,500 00	300,000 00	27,500 00	131,000 00	23,633 23	.....	669,633 23	24,561 63	694,194 86
New Westminster	414,000 00	1,294,000 00	1,698,037 00	916,500 00	206,000 00	.....	.....	1,363,925 84	60,000 00	5,952,462 84	768,196 32‡	6,720,659 16
North Vancouver	430,030 00	246,500 00	572,669 00	526,000 00	.....	.....	238,000 00	935,525 00	65,000 00	3,013,724 00	366,893 28	3,380,617 28
Port Alberni	.....	20,000 00	6,500 00	170,000 00	40,000 00	.....	.....	.....	.....	236,500 00	3,223 81	239,723 81
Port Coquitlam	35,000 00	237,500 00	94,000 00	100,000 00	.....	.....	.....	.....	7,500 00	474,000 00	102,141 18	576,141 18
Port Moody	.....	.....	43,000 00	80,000 00	.....	.....	.....	50,300 00	.....	173,300 00	124,973 16§	298,273 16
Prince George	.....	44,000 00	18,000 00	115,000 00	74,000 00	.....	.....	.....	51,000 00	302,000 00	33,477 35	335,477 35
Prince Rupert†	20,000 00	.....	151,330 53	389,905 82	242,005 01	.....	30,338 67	800,642 87	75,000 00	1,709,222 90	.....	1,709,222 90
Revelstoke	43,000 00	63,000 00	34,224 21	85,000 00	227,500 00	.....	.....	173,226 92	.....	625,951 13	22,500 00	648,451 13
Rossland	30,000 00	52,500 00	52,000 00	35,000 00	.....	.....	.....	.....	.....	169,500 00	8,372 24	177,872 24
Salmon Arm	1,500 00	.....	8,500 00	85,000 00	42,000 00	.....	.....	.....	.....	137,000 00	156 35	137,156 35
Slocan	.....	.....	4,200 00	.....	.....	.....	.....	.....	.....	4,200 00	227 43	4,427 43
Trail	45,500 00	.....	15,500 00	98,900 00	.....	.....	.....	65,500 00	10,800 00	236,200 00	2,181 62	238,381 62
Vancouver	4,146,900 00	7,242,600 00	9,544,800 00	4,749,351 20	.....	.....	.....	9,643,995 69	289,000 00	35,616,646 89	1,973,631 33	37,590,278 22
Vernon	47,500 00	70,300 00	97,000 00	240,000 00	189,000 00	.....	.....	223,963 28	20,000 00	887,763 28	9,734 56	897,497 84
Victoria	1,419,668 71	595,000 00	3,924,332 84	4,176,090 84	.....	.....	.....	8,050,479 25	140,000 00	18,305,571 64	1,511,503 83‖	19,817,075 47
Totals	$7,124,562 36	$10,148,737 61	$17,083,911 33	$12,946,472 16	$1,920,755 01	$ 434,500 00	$ 899,838 67	$21,822,932 63	$ 868,300 00	$73,250,009 77	$5,074,984 69	$ 78,324,994 46

Districts.

Burnaby	$ 287,500 00	$ 1,163,500 00	$ 70,000 00	$ 636,150 00	.....	.....	.....	$ 19,000 00	.....	$ 2,176,150 00	$ 200,443 78	$ 2,376,593 78
Chilliwhack	15,000 00	.....	.....	.....	.....	.....	.....	.....	.....	15,000 00	17,552 10	32,552 10
Coldstream	.....	9,000 00	.....	120,000 00	.....	.....	.....	.....	.....	129,000 00	2,091 19	131,091 19
Coquitlam	.....	82,500 00	.....	8,175 42	.....	.....	.....	.....	.....	90,675 42	.....	90,675 42
Delta	.....	50,000 00	15,000 00	205,000 40	.....	.....	.....	106,216 99	.....	376,217 39	1,810 00	378,027 39
Esquimalt	27,500 00	.....	.....	.....	.....	$ 374,000 00	.....	.....	$ 17,000 00	418,500 00	4,000 00	422,500 00
Fraser Mills	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,500 00	5,500 00
Kent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,388 67	12,388 67
Langley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,320 00	3,320 00
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,577 74	4,577 74
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....	2,000 00	2,000 00	10,000 00	12,000 00
Mission	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,931 94	14,931 94
North Cowichan	.....	35,000 00	.....	.....	.....	.....	.....	.....	.....	35,000 00	5,663 83	40,663 83
North Vancouver	103,000 00	507,243 00	411,757 00	194,725 00	.....	.....	.....	129,097 40	74,500 00	1,420,322 40	108,290 43	1,528,612 83
Oak Bay	133,000 00	.....	96,000 00	200,000 00	.....	425,000 00	.....	480,224 46	.....	1,334,224 46	57,424 46	1,391,648 92
Peachland	1,000 00	5,200 00	6,000 00	9,500 00	$ 18,800 00	.....	.....	.....	.....	40,500 00	7,704 17	48,204 17
Penticton	117,700 00	42,000 00	38,800 00	203,000 00	162,000 00	.....	$ 267,000 00	13,500 00	23,000 00	867,000 00	16,798 13	883,798 13
Pitt Meadows	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,637 42	2,637 42
Point Grey	739,138 31	1,920,045 16	1,766,936 08	1,446,998 40	.....	.....	.....	4,000 89	94,000 00	5,971,118 84	87,135 90	6,058,254 74
Richmond	28,000 00	301,400 00	.....	365,000 00	.....	.....	.....	81,521 50	.....	775,921 50	18,108 38	794,029 88
Saanich	33,500 00	450,000 00	.....	430,500 00	.....	.....	.....	113,679 31	44,000 00	1,071,679 31	798 68	1,072,477 99
Salmon Arm	.....	.....	2,500 00	.....	.....	.....	.....	.....	.....	2,500 00	3,401 92	5,901 92
South Vancouver	1,002,644 10	3,436,186 40	450,000 00	1,013,050 00	.....	.....	.....	784,284 71	90,000 00	6,776,165 21	1,383,657 52¶	8,159,822 73
Spallumcheen	25,000 00	41,500 00	.....	.....	.....	.....	.....	26,726 00	.....	93,226 00	.....	93,226 00
Sumas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,095 35	1,095 35
Summerland	11,500 00	24,000 00	21,000 00	380,000 00	21,000 00	.....	.....	.....	.....	457,500 00	2,134 98	459,634 98
Surrey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32,287 23	32,287 23
West Vancouver	38,200 00	431,000 00	40,000 00	125,000 00	.....	.....	146,000 00	.....	25,000 00	805,200 00	.....	805,200 00
Totals	$2,562,682 41	$ 8,498,574 56	$ 2,917,993 08	$ 5,337,099 22	$ 201,800 00	$ 799,000 00	$ 413,000 00	$ 1,758,251 26	$ 369,500 00	$22,857,900 53	* $2,003,753 82	$ 24,861,654 35
Cities forward	7,114,562 36	10,148,737 61	17,083,911 33	12,946,472 16	1,930,755 01	434,500 00	899,838 67	21,822,932 63	868,300 00	73,240,009 77	5,074,984 69	78,314,994 46
Cities and districts	$9,677,244 77	$18,647,312 17	$20,001,904 41	$18,283,571 38	$2,132,555 01	$1,233,500 00	$1,312,838 67	$23,581,183 89	$1,237,800 00	$96,097,910 30	$7,078,738 51	$103,176,648 81

* Waterworks and electric light combined.
† Figures for City of Prince Rupert as of December 31st, 1919.
‡ Includes treasury certificates, $500,000.
§ Includes guarantee Port Moody Steel Works, $100,000.
‖ Includes treasury certificates, $975,000.
¶ Includes treasury certificates, $790,000.

IV.—SINKING FUNDS AS OF DECEMBER 31st, 1920.

Cities.

Municipality.	Cash.	Invested.	Total.	Sinking Fund required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Alberni	$ 422 08	$ 25,939 10	$ 26,361 18	$ 24,534 42	.....	$ 1,826 76	.....	$ 729 65
Armstrong	8,318 20	30,700 00	39,018 20	46,806 35	$ 7,788 15	.....	$ 7,347 50	.....
Chilliwack	76 90	31,716 16	31,793 06	31,424 35	.....	368 71	10,285 17	.....
Courtenay	1,313 98	1,000 00	2,313 98	2,719 41	405 43	.....	499 24	.....
Cranbrook	3,039 99	49,355 26	52,395 25	52,238 96	.....	156 29	.....	62
Cumberland	.....	.....	.....	.....	.....	.....	.....	.....
Duncan	5,245 06	37,500 00	42,745 06	43,088 81	343 75	.....	9,882 16	.....
Enderby	3,543 40	8,000 00	11,543 40	25,660 39	14,116 99	.....	14,351 81	.....
Fernie	4,625 23	108,340 80	112,966 03	110,457 59	.....	2,508 44	.....	2,683 84
Grand Forks	13,290 19	.....	13,290 19	36,640 65	23,350 46	.....	53,887 59	.....
Greenwood	3,226 00	6,640 00	9,866 00	59,280 00	49,414 00	.....	50,346 76	.....
Kamloops	23,256 99	217,077 32	240,334 31	324,496 21	84,161 90	.....	90,340 61	.....
Kaslo	104 53	12,315 68	12,420 21	12,420 21	.....	.....	.....	.....
Kelowna	2,545 62	80,550 00	83,095 62	122,829 45	39,733 83	.....	47,247 13	.....
Ladysmith	4,645 97	25,000 00	29,645 97	35,311 95	5,665 98	.....	4,841 92	.....
Merritt	176 74	30,920 99	31,097 73	31,062 89	.....	34 84	4,458 65	.....
Nanaimo	100,236 55	197,448 45	297,685 00	297,685 00	.....	.....	.....	.....
Nelson	78,631 05	294,864 73	373,495 78	389,229 00	15,733 22	.....	47,299 31	.....
New Westminster	11,687 91	686,493 79	698,181 70	879,739 23	181,557 53	.....	185,875 15	.....
North Vancouver	3,794 97	522,239 62	526,034 59	514,952 82	.....	11,081 77	.....	35,992 56
Phoenix	2,000 00	.....	2,000 00	2,000 00	.....	.....	.....	.....
Port Alberni	616 10	43,887 47	44,503 57	46,367 79	1,864 22*	.....	.....	1,775 11
Port Coquitlam	13,505 03	5,000 00	18,505 03	61,736 38	43,231 35	.....	41,230 16	.....
Port Moody	1,623 04	31,100 00	32,723 04	29,259 02	.....	3,464 02	.....	.....
Prince George	2,200 00	49,840 92	52,040 92	57,426 14	5,385 22	.....	11,702 10	.....
Prince Rupert†	.....	.....	.....	.....	.....	.....	.....	2,277 05
Revelstoke	14,941 76	126,000 00	140,941 76	140,677 57	.....	264 19	7,533 89	.....
Rossland	19,836 70	69,275 57	89,112 27	100,521 88	11,409 61	.....	.....	.....
Salmon Arm	1,281 14	17,300 00	18,581 14	24,758 80	6,177 66	.....	6,004 24	.....
Slocan	.....	.....	.....	.....	.....	.....	.....	.....
Trail	2,241 58	26,839 03	29,080 61	28,897 24	.....	183 37	.....	4,291 91
Vancouver	316,805 86	6,940,699 41	7,257,505 27	9,022,836 26	1,765,330 99	.....	1,738,864 42	.....
Vernon	75,290 16	155,100 00	230,390 16	292,607 92	62,217 76	.....	98,325 83	.....
Victoria	607,978 40	1,322,550 00	1,930,528 40	4,750,082 52	2,819,554 12	.....	2,443,324 15	.....
Totals	$1,326,501 13	$11,153,694 30	$12,480,195 43	$17,597,749 21	$5,137,442 17	$ 19,888 39	$4,873,647 79	$ 47,750 74

* $3,900 invested in municipal building-site. † No returns available.

IV.—SINKING FUNDS AS OF DECEMBER 31st, 1920—*Continued.*

DISTRICTS.

Municipality.	Cash.	Invested.	Total.	Sinking Fund required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Burnaby	$ 87,695 30	$ 125,358 74	$ 213,054 04	$ 234,846 17	$ 21,792 13*	.....	$ 20,212 07	.....
Chilliwhack	.....	8,691 18	8,691 18	8,691 18	.....	.....	.....	.....
Coldstream	794 81	32,700 00	33,494 81	31,282 29	.....	$ 2,212 52	.....	.....
Coquitlam	2,488 64	20,000 00	22,488 64	22,289 51	.....	199 13	.....	$ 262 35
Delta	11,897 17	48,000 00	59,897 17	62,387 85	2,490 68	.....	.....	6,030 59
Esquimalt	7,230 26	66,540 80	73,771 06	45,550 96	.....	28,220 10	.....	2,569 54
Fraser Mills	.....	.....	.....	.....	.....	.....	.....	.....
Kent	.....	.....	.....	.....	.....	.....	.....	.....
Langley	.....	.....	.....	.....	.....	.....	.....	.....
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....
Mission	.....	.....	.....	.....	.....	.....	.....	.....
North Cowichan	194 39	3,650 00	3,844 39	3,745 26	.....	99 13	.....	189 08
North Vancouver	446 19	143,260 68	143,706 87	143,706 87	.....	.....	.....	.....
Oak Bay	4,214 62	438,212 37	442,426 99	409,751 77	.....	32,675 22	.....	31,658 81
Peachland	185 89	9,200 00	9,385 89	12,894 41	3,508 52	.....	3,600 54	.....
Penticton	21,062 75	68,750 00	89,812 75	93,904 11	4,091 36	.....	3,743 85	.....
Pitt Meadows	.....	.....	.....	.....	.....	.....	.....	.....
Point Grey	85,568 97	456,478 44	542,047 41	479,142 61	.....	62,904 80	.....	75,579 19
Richmond	8,236 68	88,619 74	96,856 42	99,063 38	2,206 96	.....	9,909 13	.....
Saanich	458 25	309,416 71	309,874 96	292,194 11	.....	17,680 85	.....	14,973 72
Salmon Arm	507 16	250 00	757 16	1,125 22	368 06	.....	.....	.....
South Vancouver	25,991 23	292,843 95	318,835 18	701,398 21	382,563 03	.....	329,229 20	.....
Spallumcheen	1,590 76	33,197 56	34,788 32	28,699 35	.....	6,088 97	.....	5,126 40
Sumas	.....	.....	.....	.....	.....	.....	.....	.....
Summerland	14,517 12	61,500 00	76,017 12	79,979 35	3,962 23	.....	9,902 05	.....
Surrey	.....	.....	.....	.....	.....	.....	.....	.....
West Vancouver	9,636 67	55,100 00	64,736 67	97,736 67	33,000 00	.....	58,767 52	.....
Totals	$ 282,716 86	$ 2,261,770 17	$ 2,544,487 03	$ 2,848,389 28	$ 453,982 97	$150,080 72	$ 415,364 36	$136,389 68
Cities forward	1,326,501 13	11,153,694 30	12,480,195 43	17,597,749 21	5,137,442 17	19,888 39	4,873,647 79	47,750 74
Cities and districts	$1,609,217 99	$13,415,464 47	$15,024,682 46	$20,446,138 49	$5,591,425 14	$169,969 11	$5,289,012 15	$184,140 42

* Represented by mortgages foreclosed.

V.—ARREARS OF TAXES.

The following is a comparative statement of outstanding arrears of taxes, 1914–20:—

CITIES.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.	1920.
Alberni	$ 17,060 08	$ 23,258 85	$ 32,431 80	$ 39,677 75	$ 53,737 50	$ 21,805 84	$ 6,856 54
Armstrong	9,863 12	13,574 60	16,553 32	18,733 44	18,404 24	7,568 84	3,186 49
Chilliwack	24,239 91	43,131 68	27,572 73	27,634 87	23,131 73	13,463 33	8,538 98
Courtenay	.....	3,231 49	7,004 24	8,082 36	9,412 56	10,090 04	5,798 17
Cranbrook	28,245 71	46,951 89	50,021 36	35,437 21	31,523 31	28,265 30	28,198 05
Cumberland	3,331 55	11,024 76	14,745 12	13,629 39	12,654 25	1,970 79	1,392 25
Duncan	4,399 10	6,608 76	10,545 67	12,019 04	11,998 44	9,336 78	8,527 80
Enderby	11,210 80	9,372 40	9,323 02	7,341 76	8,628 97	8,863 68	9,451 71
Fernie	21,363 20	44,286 43	50,946 07	25,948 00	65,741 07	24,471 78	14,362 92
Grand Forks	26,925 59	37,462 47	51,039 03	41,652 41	47,877 33	25,660 15	13,697 10
Greenwood	12,702 50	16,938 65	21,251 00	27,361 85	30,773 92	35,538 92	42,339 11
Kamloops	49,177 30	84,288 62	123,533 10	117,701 81	119,385 81	86,025 85	65,576 28
Kaslo	7,248 80	8,100 04	8,698 63	9,471 74	4,132 05	4,123 69	3,046 84
Kelowna	54,627 34	56,350 47	64,048 70	45,524 16	38,217 89	32,173 33	16,675 18
Ladysmith	6,331 45	15,234 35	22,213 10	23,739 25	18,544 00	16,001 75	31,793 42
Merritt	29,038 76	37,007 34	42,701 86	48,284 22	20,640 54	21,008 53	11,161 92
Nanaimo	47,343 70	85,795 60	119,868 41	145,099 81	163,150 87	137,071 38	80,295 08
Nelson	64,590 44	73,140 81	78,240 05	77,262 72	87,402 22	33,464 82	35,502 78
New Westminster	237,801 07	384,731 67	481,065 77	428,354 46	360,432 80	294,815 98	188,684 88
North Vancouver	256,943 22	363,707 73	439,054 32	511,244 67	570,896 88	342,980 56	247,830 59
Phoenix	3,037 00	3,277 75	3,516 56	4,366 94	6,275 86	8,209 17	.....
Port Alberni	21,319 94	28,048 65	35,069 42	41,776 59	51,109 32	12,942 06	6,355 57
Port Coquitlam	118,219 33	132,866 96	144,719 31	172,223 26	201,267 75	135,713 89	62,213 44
Port Moody	19,266 46	44,196 52	42,309 45	57,067 98	75,045 55	33,316 54	20,395 77
Prince George	.....	40,803 09	97,685 91	145,558 29	170,697 27	70,175 26	69,002 10
Prince Rupert	149,428 67	177,524 17	117,380 10	204,040 65	196,250 18	172,741 78	*
Revelstoke	43,576 99	74,123 61	75,710 54	50,930 98	43,512 83	41,813 62	30,189 73
Rossland	17,924 09	14,926 25	16,104 20	19,242 90	22,934 85	17,907 40	12,411 55
Salmon Arm	12,123 50	11,488 08	16,266 24	11,032 07	11,923 10	9,199 64	7,897 25
Sandon	18,286 65	439 67	640 58	504 42	216 23	.....	.....
Slocan	4,052 31	5,283 51	6,392 56	7,290 39	5,449 02	5,936 24	5,948 76
Trail	3,283 41	3,018 81	4,727 00	4,690 32	10,168 01	8,068 65	5,742 61
Vancouver	1,863,985 08	3,137,423 73	4,219,211 33	5,043,110 92	5,456,453 11	5,216,455 66	3,817,632 90
Vernon	84,325 31	119,138 56	121,866 34	161,995 09	174,945 79	148,108 24	127,083 22
Victoria	708,503 55	1,688,983 31	2,332,377 85	3,057,619 84	3,428,632 54	2,960,911 20	1,919,852 59
Totals	$3,879,775 92	$6,845,741 28	$8,964,834 69	$10,642,651 56	$11,551,567 79	$9,996,200 69	$6,907,641 58

* No report available.

V.—ARREAS OF TAXES—*Continued.*

DISTRICTS.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.	1920.
Burnaby	$ 404,669 10	$ 556,647 42	$ 593,132 46	$ 564,593 43	$ 496,024 79	$ 301,081 84	$ 136,998 75
Chilliwhack	16,854 11	20,875 44	20,579 83	27,158 14	11,351 60	8,313 70	20,521 42
Coldstream	10,678 13	11,813 43	12,626 35	14,675 11	8,232 91	2,444 02	6,244 46
Coquitlam	47,744 19	37,783 19	44,886 05	54,644 32	88,735 33	69,155 66	19,881 87
Delta	18,722 26	15,929 80	24,223 91	16,182 46	15,857 18	12,959 75	5,605 81
Esquimalt	10,826 50	18,022 63	22,282 24	27,644 72	33,037 28	29,504 14	19,346 65
Fraser Mills	1 90	.....	.....	.....	.....	.....	.....
Kent	5,182 30	8,363 92	8,889 00	7,773 90	7,143 64	2,645 08	2,142 49
Langley	33,707 76	35,306 33	35,397 42	41,212 17	27,044 18	19,858 51	15,583 14
Maple Ridge	21,610 26	23,995 22	23,593 17	24,203 75	23,678 66	6,968 42	9,710 59
Matsqui	25,365 61	31,380 08	21,957 50	19,532 50	19,140 54	11,928 24	12,292 51
Mission	11,497 55	20,546 50	30,080 20	37,022 22	23,471 35	15,564 10	14,113 53
North Cowichan	10,427 05	15,273 90	18,205 22	15,031 97	20,016 72	16,307 14	19,896 54
North Vancouver	195,410 22	217,653 53	212,410 91	252,532 30	202,866 97	221,337 34	137,732 03
Oak Bay	60,132 49	110,684 27	156,376 09	131,482 78	123,037 28	89,981 36	52,025 70
Peachland	5,224 27	7,124 31	5,414 39	5,343 08	4,006 39	5,300 29	2,953 22
Penticton	38,892 85	44,441 66	46,938 42	55,757 78	43,412 05	35,708 76	34,537 86
Pitt Meadows	933 86	4,921 19	8,957 81	10,604 30	10,325 57	1,115 29	4,454 52
Point Grey	305,536 30	332,473 28	405,797 85	357,493 58	417,869 92	346,042 11	236,031 04
Richmond	65,978 50	83,210 25	94,109 12	79,789 41	69,477 19	64,493 28	50,735 67
Saanich	82,069 69	88,345 58	111,132 28	134,813 06	105,184 36	100,303 88	68,301 41
Salmon Arm	10,624 49	9,057 69	7,871 00	9,665 90	10,521 85	9,012 72	12,634 72
South Vancouver	553,740 13	581,252 54	718,297 58	888,244 34	1,113,877 42	550,547 07	300,298 15
Spallumcheen	25,663 49	36,957 90	38,872 06	38,656 80	39,340 14	24,450 81	17,134 33
Sumas	3,590 80	6,007 30	7,269 58	5,390 53	3,637 82	1,459 00	1,778 93
Summerland	16,361 89	19,878 32	22,539 15	20,449 64	20,154 33	17,752 03	12,816 60
Surrey	61,159 53	77,167 28	73,295 28	58,098 41	46,292 24	39,856 55	23,454 94
West Vancouver	71,849 27	105,521 70	125,807 94	139,479 44	95,911 15	93,829 59	103,587 15
Totals	$2,114,454 50	$2,520,634 66	$ 2,890,942 81	$ 3,037,476 04	$ 3,079,648 86	$ 2,097,920 68	$1,340,814 03
Cities forward	3,879,775 92	6,845,741 28	8,964,834 69	10,642,651 56	11,551,567 79	9,996,200 69	6,907,641 58
Cities and districts	$5,994,230 42	$9,366,375 94	$11,855,777 50	$13,680,127 60	$14,631,216 65	$12,094,121 37	$8,248,455 61

Municipality.	Land-taxes received.	Trade Licences.	Road-taxes.	Poll-tax.	Dog-tax.	Fines.	Government Grant for Schools.	Better Housing.	Receipts from Public Utilities.	Sundry Receipts.	Total
Alberni	$ 19,464 28	$ 414 40	$ 28 00	.....	$ 26 00	.....	$ 1,508 15	.....	$ 6,009 84	$ 282 90	$ 27,733 57
Armstrong	30,308 87	1,581 00	154 00	$ 231 00	54 00	$ 182 50	6,271 50	.....	21,920 51	5,929 88	66,633 26
Chilliwack	46,496 43	1,942 50	296 00	.....	307 80	2,158 35	5,994 25	.....	.....	17,279 44	74,474 77
Courtenay	20,509 11	866 00	130 00	.....	111 00	728 05	2,825 00	$ 35,231 15	10,007 80	957 53	71,365 64
Cranbrook	71,794 51	4,109 50	.....	.....	103 50	9,336 00	6,240 00	.....	32,437 73	2,031 05	126,052 29
Cumberland	14,426 54	2,112 50	230 00	.....	42 00	770 00	12,607 81	.....	.....	3,522 87	33,711 72
Duncan	24,156 22	2,065 00	352 00	.....	156 00	713 10	12,378 08	3,500 00	19,270 22	6,022 47	68,613 09
Enderby	24,102 32	405 00	214 00	.....	38 00	225 00	3,248 75	.....	3,258 22	1,632 83	33,124 12
Fernie	91,132 55	6,422 50	744 00	2,735 00	347 50	9,001 10	13,006 40	.....	53,047 36	10,749 67	187,186 08
Grand Forks	51,907 80	1,541 00	94 00	.....	94 00	483 85	6,464 34	.....	22,069 49	5,281 40	87,935 88
Greenwood	8,475 13	385 00	.....	.....	.....	.....	4,987 90	.....	1,812 55	1,756 15	17,416 73
Kamloops	164,505 42	5,021 50	1,048 00	.....	401 00	13,559 40	9,428 35	42,424 70	186,480 09	27,365 28	450,233 74
Kaslo	13,619 70	447 50	50 00	285 00	106 00	23 00	4,290 00	.....	12,263 26	1,723 83	32,808 29
Kelowna	104,074 37	3,859 00	726 00	1,385 00	154 00	1,169 50	6,523 00	25,800 00	55,351 40	19,012 39	218,054 66
Ladysmith	24,365 21	3,130 50	298 00	.....	15 00	793 50	7,713 35	.....	13,883 02	3,788 42	53,987 00
Merritt	34,927 59	3,167 50	130 00	.....	262 50	3,792 50	4,817 30	.....	26,870 21	6,509 74	80,477 34
Nanaimo	212,714 81	8,629 00	1,976 00	.....	239 00	8,026 95	17,330 80	30,374 80	34,746 43	12,077 64	326,114 43
Nelson	135,520 07	5,335 00	858 00	.....	260 00	2,561 75	14,560 00	.....	135,966 08	16,097 62	311,158 52
New Westminster	497,361 48	10,887 50	1,508 40	1,318 00	590 50	10,444 70	45,966 94	.....	184,217 52	90,015 58	842,310 62
North Vancouver	355,691 15	4,638 00	.....	530 00	874 50	3,309 50	22,530 53	45,503 04	239,905 86	64,012 71	736,995 29
Phoenix	2,412 02	.....	.....	.....	.....	.....	847 50	.....	.....	4,520 00	7,779 52
Port Alberni	37,843 66	1,203 00	636 00	.....	108 00	222 95	2,843 33	100 00	18,558 55	15,079 91	76,595 40
Port Coquitlam	58,526 41	1,042 50	166 00	.....	96 00	264 35	2,553 60	8,853 07	3,945 38	9,418 93	84,866 24
Port Moody	50,544 37	575 00	920 00	.....	93 00	600 80	5,124 98	.....	5,355 70	4,830 28	68,044 13
Prince George	48,877 85	6,176 01	126 00	6 00	63 00	7,224 50	3,813 35	.....	29,401 17	917 91	96,605 79
Prince Rupert*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Revelstoke	95,026 45	1,877 00	1,250 00	.....	370 00	1,096 90	10,010 00	.....	53,673 97	3,237 78	166,542 10
Rossland	35,022 18	2,633 00	294 95	.....	154 19	1,932 50	8,723 30	.....	9,289 27	14,441 49	72,490 88
Salmon Arm	21,583 37	847 50	24 00	.....	40 00	285 40	3,406 93	3,500 00	10,133 81	6,225 15	46,046 16
Slocan	2,264 02	45 00	.....	.....	.....	.....	1,177 10	.....	281 97	946 19	4,714 28
Trail	69,888 96	4,073 50	826 00	.....	120 00	3,208 55	10,991 25	389 28	16,120 05	3,723 41	109,341 00
Vancouver	6,867,259 71	225,362 70	.....	.....	3,004 25	209,001 85	239,199 90	.....	516,287 12	216,446 62	8,276,562 15
Vernon	161,226 87	4,173 00	558 00	494 00	326 00	4,627 50	11,566 20	20,105 00	74,782 43	17,643 97	295,502 97
Victoria	1,911,125 00	69,948 50	6,504 00	.....	3,656 00	16,727 22	86,748 30	158,052 51	242,307 80	244,027 25	2,739,096 58
Totals	$11,307,154 43	$384,916 61	$20,141 35	$ 6,984 00	$12,212 74	$312,471 27	$595,698 19	$373,833 55	$ 2,039,654 81	$ 837,508 29	$15,870,574 24

* No returns available.

Districts.

Burnaby	$ 465,621 30	$ 2,767 50	$ 374 00	.....	$ 978 50	$ 6,204 25	$ 27,286 00	$ 19,625 89	$ 47,014 01	$ 69,339 07	$ 639,210 52
Chilliwhack	68,523 06	505 00	70 00	.....	.....	2,019 65	14,037 19	.....	.....	15,349 56*	100,504 46
Coldstream	23,185 77	.....	.....	.....	.....	14 40	1,071 52	.....	1,720 30	1,481 84	27,473 83
Coquitlam	27,856 63	400 00	670 25	.....	30 25	617 50	4,002 00	.....	577 35	30,665 20†	64,819 18
Delta	95,953 61	1,217 50	974 00	.....	150 00	1,258 60	10,742 25	.....	11,775 55	13,209 36	135,280 87
Esquimalt	111,007 43	977 00	206 00	.....	478 00	640 00	10,538 50	11,391 09	.....	5,512 77	140,750 79
Fraser Mills	4,165 71	88 50	.....	.....	10 00	267 00	.....	.....	.....	26 00	4,557 21
Kent	8,043 33	325 00	.....	.....	.....	10 00	3,854 45	.....	.....	8,148 97	20,381 75
Langley	63,279 74	1,429 00	2,628 00	.....	.....	1,091 00	12,861 23	.....	.....	14,077 38	95,366 35
Maple Ridge	41,954 90	1,325 00	1,544 00	.....	.....	180 00	10,787 50	.....	.....	7,649 47	63,440 87
Matsqui	47,068 39	280 00	.....	$ 81 51	.....	77 76	13,149 20	2,000 00	.....	2,988 49	65,645 35
Mission	41,404 09	97 50	498 80	.....	.....	50 00	11,638 55	.....	.....	3,746 49	57,435 43
North Cowichan	32,610 39	520 00	1,325 20	.....	357 00	122 50	.....	.....	.....	442 89	35,377 98
North Vancouver	158,105 11	360 00	909 20	.....	384 90	2,521 29	10,440 00	.....	10,165 39	56,609 60	239,495 49
Oak Bay	272,576 28	958 50	2 00	1,520 00	620 00	833 00	10,440 00	16,883 59	20,082 78	16,507 70	340,423 85
Peachland	12,003 81	125 00	.....	.....	47 50	19 20	2,798 00	.....	4,541 16	347 54	19,882 21
Penticton	99,380 54	3,384 25	.....	.....	218 00	2,862 00	10,524 96	18,000 00	78,573 84	13,817 24	226,760 83
Pitt Meadows	11,421 62	10 00	182 00	.....	.....	.....	1,160 00	.....	.....	450 41	13,224 03
Point Grey	763,975 83	240 00	511 90	.....	652 00	3,998 50	28,826 00	59,556 28	37,128 33	64,096 71	958,985 55
Richmond	151,062 42	2,298 00	1,948 00	2,647 00	104 00	7,642 00	12,377 75	.....	27,918 67	25,083 86	231,081 70
Saanich	312,156 44	245 00	1,242 00	.....	984 50	3,270 00	32,869 81	7,209 94	29,649 50	19,569 30	407,196 49
Salmon Arm	24,759 34	5 00	.....	18 00	.....	.....	5,104 00	.....	.....	3,941 28	33,827 62
South Vancouver	1,013,139 56	3,015 00	4,340 40	.....	3,881 00	7,230 50	103,466 80	81,532 59	85,810 84	80,455 46	1,382,872 15
Spallumcheen	35,816 93	20 00	36 00	90 00	.....	.....	3,672 50	.....	.....	1,601 05	41,236 48
Sumas	17,108 61	.....	110 00	.....	.....	.....	3,031 25	.....	.....	261 44	20,511 30
Summerland	58,634 55	507 50	.....	787 34	122 40	124 30	9,360 03	.....	41,908 88	14,782 62	126,227 62
Surrey	93,359 69	650 00	1,588 00	.....	226 50	5,128 00	16,424 58	.....	.....	7,877 16	125,253 93
West Vancouver	106,333 06	640 00	.....	.....	113 00	257 50	4,002 00	25,080 60	67,099 52	19,790 01	223,315 69
Totals	$ 4,160,508 14	$ 22,390 25	$19,159 75	$ 5,143 85	$ 9,357 55	$ 46,438 95	$374,466 07	$241,279 98	$ 463,966 12	$ 497,828 87	$ 5,840,539 53
Cities forward	11,307,154 43	384,916 61	20,141 35	6,984 00	12,212 74	312,471 27	595,698 19	373,833 55	2,039,654 81	837,508 29	15,870,574 24
Cities and districts	$15,467,662 57	$407,306 86	$39,301 10	$12,127 85	$21,570 29	$358,910 22	$970,164 26	$615,113 53	$2,503,620 93	$1,335,337 16	$21,711,113 77

* Includes collections, $14,340.54 for dyking districts. † Includes $23,109.84 received from sale of lands.

Note.—The figures submitted under the headings of "Receipts" and "Expenditures" are prepared very largely from an analysis of the auditors' reports, and although the classification of expenditures is not uniform in the different municipalities, and it is in many cases extremely difficult to make a distribution of the items, yet the statements have been prepared with a good deal of care and may be taken as substantially correct. Items which are of the nature of cross-entries, deposit accounts, and trust accounts, which would have the effect of inflating the figures, have as far as possible been eliminated.

Better Housing.	Interest on Temporary Loans.
.....	.....
.....	$ 371 92
.....	260 09
$ 35,231 15	277 85
.....	741 15
.....	126 25
3,525 30	71 93
.....	315 50
.....	1,224 18
.....	1,064 68
.....	122 26
50,013 56	443 57
.....	18 00
24,008 84	1,022 25
.....	141 73
.....	230 70
26,437 47	2,074 12
.....	413 76
.....	39,712 00
46,878 32	26,278 70
.....	.....
1,232 00	63 25
8,711 60	11,493 55
.....	1,774 39
.....	1,448 47
.....	.....
.....	1,815 64
.....	393 51
3,071 44	466 71
.....	.....
244 74	976 90
.....	286,112 90
10,012 20	2,721 23
119,798 20	50,498 07
$329,164 82	$432,675 26

$ 18,491 70	$ 35,011 47
.....	1,485 54
.....	373 86
.....	90 94
.....	.....
9,654 28	975 67
.....	.....
.....	376 90
.....	624 40
.....	390 04
1,979 08	728 62
.....	682 26
.....	162 03
.....	4,467 57
16,872 65	4,363 68
.....	691 87
18,000 00	2,406 10
.....	.....
59,068 79	13,748 44
.....	2,183 68
7,693 82	3,240 96
.....	424 55
82,893 39	65,090 77
.....	102 52
.....	44 85
.....	1,310 75
.....	3,308 47
24,780 60	865 04
$239,434 31	$143,150 98
329,164 82	432,675 26
$568,599 13	$575,826 24

Municipality.	Interest on Debentures exclusive of Schools and Public Utilities.	Sinking Fund for Debentures exclusive of Schools and Public Utilities.	Roads and Streets.	Street-lighting.	Parks.	Sewers.	Fire-protection.	Public Health.	Administration of Justice.	Schools.	Better Housing.	Interest on Temporary Loans.	Donations and Grants.	Council Salaries.	Salaries and Office Expenses.	Public Utilities, including Interest and Sinking Fund.	Sundry Expenditures.	Total.
Alberni	$ 480 00	$ 297 75	$ 1,132 99	$ 430 00	$ 50 00	.....	$ 1,296 00	$ 175 00	$ 622 67	$ 4,742 51	.....	.....	.....	.....	$ 3,554 55	$ 11,878 85	$ 1,836 30	$ 26,496 62
Armstrong	1,132 04	791 79	4,952 09	2,500 00	.....	.....	.....	368 35	1,740 75	22,470 96	.....	$ 371 92	$ 890 00	$ 700 00	1,880 66	32,177 48	3,538 76	73,514 80
Chilliwack	8,977 72	3,238 80	4,005 63	1,955 00	.....	$ 3,050 25	2,594 81	595 46	2,541 58	33,158 45	.....	260 09	430 00	700 00	3,326 44	.....	950 24	65,784 47
Courtenay	.....	.....	4,695 39	513 03	.....	.....	.....	39 00	636 90	3,569 46	6,858 47	$ 35,231 15	277 85	175 00	.....	2,864 96	9,046 05	7,158 88	71,066 14
Cranbrook	8,345 99	3,032 08	8,457 39	3,030 02	.....	928 82	9,281 90	770 11	7,547 10	36,336 22	.....	741 15	1,560 00	.....	4,456 15	30,315 10	8,137 08	122,939 11
Cumberland	.....	.....	4,660 78	.....	.....	.....	1,191 78	102 14	2,225 45	19,047 70	.....	126 25	.....	.....	1,706 64	.....	3,171 43	32,232 17
Duncan	1,556 00	1,790 31	2,047 84	1,900 00	.....	.....	1,404 62	104 48	1,209 75	18,601 10*	3,525 30	71 93	900 00	375 00	2,141 11	19,220 59	6,977 61	61,825 64
Enderby	2,399 92	1,343 29	2,363 16	747 31	29 19	.....	.....	781 32	860 99	13,740 05	.....	315 50	.....	.....	2,040 07	3,383 95	2,117 85	30,122 60
Fernie	9,580 24	2,575 98	3,859 21	.....	204 77	1,124 01	5,080 88	2,698 39	7,789 43	52,532 77	.....	1,224 18	1,640 00	.....	1,841 82	41,927 07	12,183 82	144,262 57
Grand Forks	3,727 50	2,511 71	2,244 64	184 50	.....	.....	929 55	346 60	2,441 78	25,370 54	.....	1,064 68	100 00	1,000 00	5,166 36	15,750 74	23,630 25	84,468 85
Greenwood	1,527 25	.....	892 86	630 00	.....	.....	490 40	.....	322 50	7,140 00	.....	122 26	.....	.....	1,718 71	2,980 83	862 94	16,687 75
Kamloops	13,393 68	11,577 86	26,723 87	.....	3,762 89	632 61	11,586 44	3,874 74	14,842 79	41,063 77	50,013 56	443 57	7,031 05	2,300 00	9,790 33	203,961 73	37,318 22	438,317 31
Kaslo	360 00	523 40	1,372 58	1,200 00	171 65	.....	384 00	100 00	417 25	12,630 98	.....	18 00	.....	.....	1,936 36	12,577 39	2,589 25	34,500 86
Kelowna	11,424 78	6,665 00	20,852 96	1,872 37	2,923 68	2,935 72	2,308 96	.....	5,441 01	40,414 76	24,008 84	1,022 25	2,853 80	1,015 00	6,212 17	65,522 88	21,789 95	217,264 13
Ladysmith	4,288 55	2,262 85	903 90	1,000 00	.....	76 90	231 50	295 00	3,172 00	22,574 27	.....	141 73	125 00	432 60	2,094 15	15,406 97	6,913 52	59,918 94
Merritt	1,500 00	1,616 63	3,342 60	5,500 00	158 01	.....	413 30	94 00	3,736 74	14,617 84	.....	230 70	748 06	.....	1,387 17	28,335 61	14,964 58	76,645 24
Nanaimo	32,788 16	20,619 36	10,929 73	6,454 93	1,476 38	2,405 90	8,214 28	2,245 90	10,355 54	64,307 75	26,437 47	2,074 12	2,921 92	2,741 63	11,190 93	37,827 38	60,277 40	303,268 78
Nelson	7,581 79	6,692 93	19,651 84	8,335 00	1,238 46	124 17	11,288 30	802 68	6,573 84	66,514 74	.....	413 76	1,308 50	1,200 00	11,568 16	108,190 52	33,738 82	285,223 51
New Westminster	142,332 12	54,644 40	92,908 72	3,927 00	8,566 81	6,862 39	50,094 16	7,001 09	24,403 75	185,628 24	.....	39,712 00	20,450 96	4,800 00	24,104 66	139,344 36	99,663 19	904,443 85
North Vancouver	81,593 84	42,286 04	33,994 74	7,266 60	4,568 32	123 40	17,802 12	2,915 87	14,049 64	107,657 78	46,878 32	26,278 70	3,868 70	3,000 00	17,202 96	235,289 59	23,342 71	670,119 23
Phoenix	360 00	225 30	.....	.....	.....	.....	98 00	.....	1,484 55	2,546 38	.....	.....	.....	.....	2,127 50	.....	1,607 81	8,447 54
Port Alberni	1,727 71	1,942 63	7,697 14	3,000 00	.....	.....	2,092 48	1,988 31	1,966 09	11,537 03	1,232 00	63 25	601 70	908 00	3,334 87	32,900 92	7,807 36	78,799 49
Port Coquitlam	17,990 00	8,204 85	4,742 40	1,706 25	.....	.....	3,272 23	1,291 00	1,191 32	14,076 50	8,711 60	11,493 55	150 00	2,388 05	5,640 58	10,071 11	6,469 98	97,339 42
Port Moody	5,598 00	4,152 80	5,352 47	1,017 45	183 58	.....	450 65	317 50	2,325 43	12,885 07	.....	1,774 39	200 00	.....	4,279 88	8,529 60	24,943 48	72,010 30
Prince George	3,120 00	4,503 63	1,339 99	2,000 00	.....	.....	6,292 75	1,255 73	10,988 02	19,401 91	.....	1,448 47	2,606 82	2,032 35	10,311 91	42,473 22	10,331 82	118,106 62
Prince Rupert†	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Revelstoke	17,022 66	9,592 05	4,615 93	1,534 35	123 28	572 59	2,244 91	687 78	6,346 96	38,656 29	.....	1,815 64	1,256 41	500 00	4,023 20	54,646 39	16,874 64	160,313 08
Rossland	5,370 00	5,962 02	6,275 53	2,071 43	.....	.....	7,457 28	1,874 59	2,666 31	32,079 37	.....	393 51	112 80	732 00	3,623 28	23,537 22	3,789 20	95,964 54
Salmon Arm	510 00	741 47	3,533 85	1,831 20	.....	.....	36 00	132 95	209 90	9,964 96	3,071 44	466 71	1,157 84	.....	4,526 02	18,419 22	1,254 61	45,856 17
Slocan	.....	600 00	23 80	.....	.....	.....	5 48	.....	.....	3,299 47	.....	.....	50 00	.....	494 00	515 53	398 83	5,387 11
Trail	5,164 20	2,681 75	9,095 92	812 85	.....	162 51	1,047 44	162 50	4,104 18	44,163 35	244 74	976 90	415 00	1,125 00	10,202 09	17,657 21	8,738 00	106,663 64
Vancouver	1,114,282 73	759,161 56	674,715 53	86,292 92	103,799 84	138,297 54	432,955 20	71,261 30	539,970 60	1,536,190 65	.....	286,112 90	242,978 45	14,600 00	182,733 83	458,065 33	320,358 32	6,961,776 70
Vernon	20,277 26	13,381 80	14,467 48	7,500 00	731 43	2,006 57	6,656 61	1,472 42	7,909 26	51,599 42	10,012 20	2,721 23	2,096 61	.....	4,657 97	79,927 49	16,652 18	242,069 93
Victoria	570,204 85	595,631 58	183,922 87	50,836 74	26,131 19	42,804 92	152,439 33	46,717 30	109,712 76	500,472 85	119,798 20	50,498 07	32,115 10	6,874 41	66,782 39	269,828 23	374,429 59	3,199,200 38
Totals	$2,094,616 99	$1,569,249 62	$1,165,885 83	$206,048 95	$154,119 48	$202,108 30	$739,680 36	$151,069 61	$802,739 40	$3,072,282 15	$329,164 82	$432,675 26	$328,743 72	$ 47,444 04	$418,941 88	$2,029,708 56	$1,166,758 62	$14,911,237 49

Districts.

Burnaby	$ 64,860 00	$ 29,604 00	$ 84,846 33	$ 9,463 77	$ 825 34	$ 16,230 54	.....	$ 667 17	$ 22,291 95	$ 134,895 53	$ 18,491 70	$ 35,011 47	$ 775 00	$ 2,737 50	$ 31,748 77	$ 95,616 55	$ 77,196 85	$ 625,262 47
Chilliwhack	.....	.....	22,555 89	.....	.....	.....	$ 70 00	.....	2,582 47	47,437 96	.....	1,485 54	900 00	1,300 00	1,994 39	.....	32,772 39‡	111,098 64
Coldstream	480 00	749 61	8,423 72	.....	.....	.....	.....	.....	84 25	3,922 62	.....	373 86	365 00	.....	3,146 41	12,874 05	1,886 44	32,305 96
Coquitlam	4,200 00	1,337 63	13,738 13	493 50	.....	.....	130 00	75 00	1,417 43	8,633 75	.....	90 94	200 00	1,900 00	4,989 22	1,748 65	29,261 33	68,215 58
Delta	6,443 97	3,833 45	28,663 17	.....	.....	.....	115 60	175 00	1,855 35	26,779 35	.....	.....	3,233 95	1,190 00	5,665 08	24,343 65	28,066 88	130,365 45
Esquimalt	20,000 00	3,546 20	29,497 64	1,580 62	.....	3,684 89	1,695 71	1,074 20	4,786 75	39,278 68	9,654 28	975 67	1,310 00	1,500 00	7,648 51	.....	14,790 02	141,023 17
Fraser Mills	.....	.....	1,367 83	240 00	.....	100 00	100 00	.....	1,623 84	510 60	.....	.....	.....	.....	601 30	.....	.....	4,543 57
Kent	.....	.....	686 16	.....	.....	.....	.....	50 00	48 65	9,214 59	.....	376 90	100 00	.....	1,037 91	.....	13,042 08	24,556 29
Langley	.....	.....	30,528 50	216 00	.....	.....	23 00	305 00	1,314 41	38,984 57	.....	624 40	1,387 09	1,700 00	6,981 13	.....	11,674 34	93,738 44
Maple Ridge	.....	.....	23,520 70	616 25	.....	.....	.....	217 50	1,462 95	22,917 74	.....	390 04	1,010 00	1,475 00	5,278 73	.....	3,817 99	60,706 90
Matsqui	.....	.....	26,663 21	.....	.....	.....	.....	100 00	345 62	32,637 96	1,979 08	728 62	645 00	1,500 00	2,713 13	.....	2,012 03	69,324 65
Mission	.....	.....	18,977 64	274 30	.....	.....	.....	.....	39 05	34,437 24	.....	682 26	345 00	1,037 50	4,121 45	.....	16,646 31	76,560 75
North Cowichan	1,750 00	1,375 00	15,898 95	.....	.....	.....	.....	.....	1,801 49	11,756 17	.....	162 03	1,635 00	762 90	3,307 35	.....	7,972 41	46,421 50
North Vancouver	45,994 22	12,931 20	74,580 83	3,946 99	668 77	.....	4,072 07	1,803 59	9,380 99	41,987 56	.....	4,467 57	2,007 24	2,550 00	17,479 50	21,091 86	26,504 88	269,467 27
Oak Bay	53,914 31	42,751 53	11,854 31	1,220 61	734 28	2,898 31	8,416 50	964 52	6,629 22	55,154 00	16,872 65	4,363 68	1,924 80	.....	12,274 04	24,480 12	86,182 98	330,635 86
Peachland	622 00	376 09	2,891 02	1,778 00	77 47	.....	50 00	90 50	144 45	7,842 27	.....	691 87	.....	.....	1,174 67	9,301 31	767 12	25,806 77
Penticton	5,005 00	3,030 81	15,828 19	5,000 00	130 00	.....	4,117 63	293 78	5,562 19	42,735 24	18,000 00	2,406 10	1,816 06	1,875 00	8,131 04	72,771 84	25,612 89	212,315 77
Pitt Meadows	.....	.....	8,013 95	.....	.....	.....	.....	.....	237 20	2,983 29	.....	.....	.....	525 00	1,994 04	.....	3,231 53	16,985 01
Point Grey	181,851 15	32,832 86	71,572 66	11,754 05	11,492 02	50,809 86	26,019 90	1,497 13	25,400 46	162,686 66	59,068 79	13,748 44	961 67	3,100 00	37,154 26	115,265 89	66,514 19	871,729 99
Richmond	16,912 29	3,872 37	47,701 42	942 00	.....	.....	.....	1,543 85	9,082 94	37,036 68	.....	2,183 68	885 00	2,500 00	8,690 09	27,619 49	60,197 81	219,167 62
Saanich	29,179 93	24,768 56	50,802 80	986 68	1,100 00	4,868 79	1,595 46	4,397 43	9,233 68	105,997 54	7,693 82	3,240 96	4,224 54	2,000 00	21,731 04	48,092 49	65,107 61	385,021 33
Salmon Arm	150 00	363 07	16,874 14	.....	.....	.....	.....	.....	.....	89 50	11,372 60	.....	424 55	1,140 00	935 00	2,980 29	.....	4,454 53	38,983 68
South Vancouver	218,991 55	83,428 32	66,009 16	20,371 81	1,182 48	28,075 34	22,700 11	4,996 34	24,809 23	405,432 01	82,893 39	65,090 77	15,417 74	.....	57,467 40	144,967 22	137,308 16	1,399,141 03
Spallumcheen	2,431 00	1,023 34	9,592 17	.....	.....	.....	.....	120 00	.....	16,564 08	.....	102 52	1,250 00	.....	3,321 25	4,067 06	2,237 98	40,769 40
Sumas	.....	.....	6,793 74	.....	.....	.....	.....	100 00	28 50	8,120 96	.....	44 85	300 00	800 00	821 17	.....	1,917 55	18,926 77
Summerland	1,550 00	1,255 97	5,212 94	500 00	.....	.....	8 32	50 00	782 00	29,933 76	.....	1,310 75	1,187 65	550 00	2,761 81	54,998 22	9,505 77	109,607 19
Surrey	.....	.....	59,184 82	380 00	.....	.....	90 00	567 24	4,866 18	49,637 20	.....	3,308 47	845 20	1,500 00	9,382 49	.....	15,516 37	145,277 97
West Vancouver	21,352 24	4,669 39	22,315 90	.....	.....	.....	.....	257 50	2,553 20	21,236 81	24,780 60	865 04	1,500 00	2,000 00	12,773 06	81,451 30	11,072 03	207,827 07
Totals	$ 675,687 66	$ 251,749 40	$ 774,595 92	$ 59,764 58	$ 16,210 36	$106,667 73	$ 69,204 30	$ 19,345 75	$139,433 95	$1,410,327 42	$239,434 31	$143,150 98	$ 45,365 94	$ 33,437 90	$277,369 73	$ 738,689 70	$ 775,270 47	$ 5,775,726 10
Cities forward	2,094,616 99	1,569,249 62	1,165,885 83	206,048 95	154,119 48	202,108 30	739,680 36	151,069 61	802,739 40	3,072,282 15	329,164 82	432,675 26	328,743 72	47,444 04	418,941 88	2,029,708 56	1,166,758 62	14,911,237 49
Cities and districts	$2,770,304 65	$1,820,999 02	$1,940,481 75	$265,813 53	$170,329 84	$308,776 03	$808,884 66	$170,415 36	$942,193 35	$4,482,609 57	$568,599 13	$575,826 24	$374,109 57	$ 80,881 94	$696,311 61	$2,768,395 26	$1,942,029 09	$20,686,963 59

* School district consolidated with North Cowichan. † No returns available. ‡ Includes payments, $14,283.20, to dyking districts and $9,943.46 for ditching schemes.

VIII.—TAXES LEVIED, 1920.

Cities.		Districts.	
Alberni	$ 25,551 10	Burnaby	$ 432,686 06
Armstrong	24,867 39	Chilliwhack	83,846 39
Chilliwack	48,241 01	Coldstream	26,190 08
Courtenay	14,029 97	Coquitlam	21,670 56
Cranbrook	68,555 75	Delta	73,762 19
Cumberland	14,104 54	Esquimalt	97,380 22
Duncan	22,653 45	Fraser Mills	4,165 71
Enderby	23,122,52	Kent	9,643 00
Fernie	78,091 95	Langley	61,982 78
Grand Forks	36,816 18	Maple Ridge	43,231 96
Greenwood	14,817 57	Matsqui	44,820 00
Kamloops	129,588 57	Mission	41,355 10
Kaslo	12,614 59	North Cowichan	37,697 92
Kelowna	82,845 17	North Vancouver	160,925 63
Ladysmith	27,485 42	Oak Bay	205,621 70
Merritt	24,008 26	Peachland	11,232 69
Nanaimo	137,058 08	Penticton	90,499 77
Nelson	142,267 33	Pitt Meadows	12,285 40
New Westminster	383,467 00	Point Grey	655,629 06
North Vancouver	365,159 03	Richmond	122,122 00
Phoenix	1,010 57	Saanich	257,890 72
Port Alberni	39,172 26	Salmon Arm	29,625 86
Port Coquitlam	70,511 31	South Vancouver	819,929 00
Port Moody	49,671 59	Spallumcheen	28,990 21
Prince George	57,227 56	Sumas	14,803 30
Prince Rupert	298,403 33	Summerland	55,179 51
Revelstoke	62,891 71	Surrey	89,848 86
Rossland	48,608 00	West Vancouver	116,787 94
Salmon Arm	19,903 29		
Slocan	3,434 22	Total	$ 3,649,803 62
Trail	66,725 89	Cities forward	10,152,820 27
Vancouver	5,813,543 31		
Vernon	129,213 68	Cities and districts	$13,802,623 89
Victoria	1,817,158 67		
Total	$10,152,820 27		

IX.—COMPARATIVE STATEMENT OF MONEYS COLLECTED FROM PRINCIPAL SOURCES OF REVENUE, 1914–20.

Item of Revenue.	1914.	1915.	1916.	1917.	1918.	1919.	1920.
Taxes	$8,698,819 73	$8,639,020 63	$8,461,513 83	$9,340,932 90	$10,593,177 86	$14,055,731 10	$15,467,662 57
Trade licences	163,919 85	158,510 20	145,939 90	158,731 75	153,450 30	320,788 84	407,306 86
Liquor licences	221,300 00	213,051 00	288,070 00	153,204 33	.....	.....	.....
Government grant to schools	760,000 99	790,091 16	748,848 07	824,259 72	892,109 73	898,897 73	970,164 26
Fines and costs	130,568 40	95,497 51	83,885 73	104,150 51	160,885 74	221,527 47	358,910 22

X.—COMPARATIVE STATEMENT OF EXPENDITURES ON STREETS, FIRE, ADMINISTRATION OF JUSTICE, PUBLIC HEALTH, AND COUNCIL SALARIES, 1914–20.

Item of Expenditure.	1914.	1915.	1916.	1917.	1918.	1919.	1920.
Streets	$5,323,970 48	$2,444,368 70	$1,445,660 72	$1,350,198 45	$1,266,277 09	$1,583,288 74	$1,940,481 75
Fire	769,772 90	604,149 62	569,745 77	545,744 64	587,191 46	682,403 75	808,884 66
Administration of justice	803,361 73	681,660 19	570,943 46	562,158 66	600,507 81	743,180 05	942,193 35
Public health	246,977 52	207,494 80	170,850 73	166,343 50	200,612 70	196,535 88	170,415 36
Council salaries	92,556 38	82,616 96	77,353 91	80,869 04	80,940 06	84,721 10	80,881 94
Schools	2,693,645 19	2,661,051 65	2,680,265 77	2,902,801 83	3,154,418 13	3,716,626 49	4,482,609 57

XI.—MONEY BY-LAWS.

Certificates of approval were issued during 1920 for money by-laws as follows:—

Date.	Municipality.	By-law No.	Purpose.	Amount.	Term.	Rate.
1920.					Years.	Per Cent.
Jan. 29	Victoria	2060	Local improvement assessment consolidation	$ 213,065 52	20	6
Feb. 2	Prince Rupert	341	Construction of school	150,000 00	30	6
„	„	342	Repair of roads	25,000 00	5	6
Mar. 10	Penticton	210	School purposes	85,000 00	40	6
„ 16	Prince Rupert	344	Construction of bridge	12,000 00	15	6
April 6	Penticton	207	Construction of irrigation system	97,000 00	30	6
„ 6	„	209	Construction of domestic water system	35,000 00	25	6
June 5	New Westminster	352	Technical school loan	25,000 00	20	6
July 5	North Vancouver District	....	School loan	41,000 00	20	6
„ 16	Rossland	219	Maintenance and repair of waterworks	15,000 00	20	7
„ 20	Prince George	103	Street improvements	10,000 00	10	6
„ 20	„	105	Enlarging hospital	15,000 00	15	6
„ 20	„	111	Erecting school building	60,000 00	15	6
„ 20	Point Grey	18	School Board expenditures	33,230 50	5	5½
„ 22	Prince George	88	Extending waterworks	3,000 00	15	6
„ 30	Trail	249	Cement sidewalks	9,000 00	10	7
„ 31	Armstrong	75	Constructing hospital (with Spallumcheen)	5,000 00	20	6
Aug. 2	Point Grey	19	School expenses	* 135,000 00	20	5½
„ 26	Summerland	119	Erection and equipment of hospital	15,000 00	20	6
Sept. 9	Spallumcheen	231	Erection of hospital (with Armstrong)	5,000 00	20	6
„ 13	Delta	....	Paving trunk road	100,000 00	20	6
„ 17	Merritt	94	Purchasing school-site	3,000 00	15	6
„ 17	„	95	Building school	10,000 00	15	6
Oct. 14	Victoria	2088, 2102	Local improvements, Pandora Avenue	234,630 00	50*	6
„ 14	„	2090	Local Improvements, Pembroke Street	629 52	10*	6
„ 15	Prince George	107	Extension of waterworks	15,000 00	15	6
„ 15	„	109	Extension of electric light	10,000 00	15	6
„ 19	Victoria	2080, 2105	Johnson Street Bridge	420,000 00	30	6
„ 23	„ †	2097, 2106	Treasury certificates	230,000 00	10	6
„ 23	Grand Forks	164	Loan for sinking fund	55,000 00	20	7
Nov. 18	Saanich	207	Health centre	25,000 00	10	5½
Dec. 2	Armstrong	81	Fire-protection	10,000 00	20	6
„ 3	Summerland	125	Erection of school-room	3,000 00	10	6
„ 30	Victoria	2095A	Local improvements, Fairfield Road	44,501 81	15*	6
				$2,149,0[illegible]7 35		

* Instalments. † Issue of treasury certificates pending the sale of debentures under By-laws 2088 and 2102.

It will be recognized that it is impossible with the limited information at hand to make an exhaustive report of the actual profit and loss of the municipal utilities, but the statements submitted will show the extent of the demands upon the other revenues of the municipalities by the public utilities, or, as the case may be, the extent to which the other revenues of the municipalities are supplemented by those from the public utilities.

ELECTRIC LIGHT—CITIES.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Alberni	$ 9,596 69	$ 4,621 77	$ 972 17	$ 5,593 94	$ 2,922 84	.....	$ 2,671 10
Armstrong	77,925 60	19,031 97	5,751 96	24,783 93	15,161 97	.....	9,621 96
Courtenay	32,912 11	6,477 38	2,568 67	9,046 05	10,007 80	$ 961 75	.....
Cranbrook	60,000 00	9,230 17	.....	9,230 17	10,134 11	903 94	.....
Duncan	65,000 00	7,889 52	5,460 78	13,350 30	13,794 69	444 39	.....
Fernie	64,149 32	24,718 37	5,244 88	29,963 25	31,371 76	1,408 51	.....
Grand Forks	18,900 00	7,294 20	300 00	7,594 20	13,701 01	6,106 81	.....
Kamloops	188,306 75	86,029 50	18,654 09	104,683 59	106,155 38	1,471 79	.....
Kaslo	21,000 00	5,307 52	2,622 84	7,930 36	8,834 76	904 40	.....
Ladysmith	26,741 43	13,541 67	1,865 30	15,406 97	13,886 02	.....	1,523 95
Nelson	326,350 64	32,778 18	25,844 65	58,622 83	69,913 94	11,291 11	.....
New Westminster	191,148 66	44,956 95	11,876 28	56,833 23	95,105 34	38,272 11	.....
Port Alberni	48,419 36	10,976 78	4,398 28	15,375 06	12,107 89	.....	3,267 17
Prince George	192,169 41	19,163 80	7,372 34	26,536 14	21,257 37	.....	5,278 77
Revelstoke	229,458 71	25,134 36	18,966 53	44,100 89	40,819 25	.....	3,281 64
Salmon Arm	37,026 44	5,996 86	3,402 72	9,399 58	6,498 36	.....	2,901 22
Vernon	147,964 76	36,482 74*	16,862 95	53,345 69	51,960 86	.....	1,384 83
Totals	$1,737,069 88	$ 359,631 74	$ 132,164 44	$ 491,796 18	$ 523,630 35	$ 61,764 81	$ 29,930 64

ELECTRIC LIGHT—DISTRICTS.

Peachland	$ 17,389 00	$ 6,400 22†	$ 1,656 31	$ 8,056 53	$ 3,798 56	.....	$ 4,257 97
Penticton	151,135 89	20,532 17	11,992 99	32,525 16	32,035 77	.....	489 39
Summerland	23,002 33	4,512 43	1,974 19	6,486 62	7,266 32	$ 779 70	.....
Totals	$ 191,527 22	$ 31,444 82	$ 15,623 49	$ 47,068 31	$ 43,100 65	$ 779 70	$ 4,747 36
Cities forward	1,737,069 88	359,631 74	132,164 44	491,796 18	523,630 35	61,764 81	29,930 64
Cities and districts	$1,928,597 10	$ 391,076 56	$ 147,787 93	$ 538,864 49	$ 566,731 00	$ 62,544 51	$ 34,678 00

* Includes capital expenditure from current revenue, $7,734.96.

† Includes capital expenditure from current revenue, $3,140.05.

WATERWORKS—CITIES.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Alberni	$ 52,205 04	$ 479 26	$ 5,805 65	$ 6,284 91	$ 3,087 00	.....	$ 3,197 91
Armstrong	42,228 02	4,360 91	3,032 64	7,393 55	6,758 54	.....	635 01
Cranbrook	183,843 83	3,807 10	17,277 83	21,084 93	22,303 62	$ 1,218 69	.....
Duncan	25,000 00	3,769 99	2,100 30	5,870 29	5,475 53	.....	394 76
Enderby	21,973 72	1,741 89	1,642 06	3,383 95	3,258 22	.....	125 73
Fernie	114,414 47	3,487 54	8,476 28	11,963 82	21,675 60	9,711 78	.....
Grand Forks	48,300 00	4,463 79	3,692 75	8,156 54	8,368 48	211 94	.....
Greenwood	28,460 54	694 93	2,286 00	2,980 93	1,812 55	.....	1,168 38
Kamloops	274,255 69	28,536 12	24,959 46	53,495 58	39,032 20	.....	14,463 38
Kaslo	21,000 00	4,426 18	220 85	4,647 03	3,428 50	.....	1,218 53
Nanaimo	386,045 16	16,046 46	21,780 92	37,827 38	34,746 43	.....	3,080 95
Nelson	47,133 71	4,847 88	2,740 20	7,588 08	32,236 94	24,648 86	.....
New Westminster	505,487 68	28,935 89	53,575 24	82,511 13	89,112 18	6,601 05	.....
North Vancouver	603,370 88	6,477 60	28,565 63	35,043 23	21,569 91	.....	13,473 32
Port Alberni	157,438 75	5,272 36*	12,253 50	17,525 86	6,450 66	.....	11,075 20
Port Coquitlam	46,404 18	3,288 10	6,783 01	10,071 11	3,945 38	.....	6,125 73
Port Moody	77,180 18	2,048 06	6,481 54	8,529 60	5,355 70	.....	3,173 90
Prince George	101,776 82	4,694 41	11,243 67	15,938 08	8,143 80	.....	7,794 28
Revelstoke	75,931 15	4,297 54	6,247 96	10,545 50	12,854 72	2,309 22	.....
Rossland	40,000 00	17,689 63	5,847 59	23,537 22	9,289 27	.....	14,247 95
Salmon Arm	59,898 74	2,133 00	6,886 64	9,019 64	3,635 45	.....	5,384 19
Slocan	4,808 46	515 50	.....	515 50	281 97	.....	233 53
Trail	99,271 30	7,949 54	9,707 67	17,657 21	16,120 05	.....	1,537 16
Vancouver	5,209,145 06	213,054 39	245,010 94	458,065 33	516,287 12	58,221 79	.....
Vernon	201,356 28	8,418 51†	18,163 29	26,581 80	22,821 57	.....	3,760 23
Victoria	3,241,908 42	49,665 60	220,162 63	269,828 23	242,307 80	.....	27,520 43
Totals	$11,668,838 08	$ 431,102 18	$ 724,944 25	$1,156,046 43	$1,140,359 19	$ 102,923 33	$ 118,610 57

* Includes capital expenditure from current revenue, $3,112.51.

† Includes capital expenditure from current revenue, $1,671.82.

XII.—PUBLIC UTILITIES, 1920—*Continued.*

WATERWORKS—DISTRICTS.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Burnaby	$ 706,151 55	$ 49,843 83	$ 45,772 72	$ 95,616 55	$ 47,014 01	.....	$ 48,602 54
Coldstream	102,475 65	4,734 49	7,139 56	11,874 05	1,720 30	.....	10,153 75
Coquitlam	6,130 08	577 20	1,171 45	1,748 65	577 35	.....	1,171 30
Delta	205,000 00	12,423 70	11,919 95	24,343 65	11,775 55	.....	12,568 10
North Vancouver	171,248 17	8,480 36	12,611 50	21,091 86	10,165 39	.....	10,926 47
Oak Bay	210,467 42	9,926 15	14,553 97	24,480 12	20,082 78	.....	4,397 34
Peachland	8,222 03	333 85	910 93	1,244 78	742 60	.....	502 18
Penticton	169,769 76	3,417 45	12,763 13	16,180 58	19,001 78	$ 2,821 20	.....
Point Grey	1,510,921 60	35,559 84*	79,706 05	115,265 89	37,128 33	.....	78,137 56
Richmond	372,948 87	8,444 73	19,174 75	27,619 48	27,918 67	299 19	.....
Saanich	466,390 73	14,986 29	33,106 20	48,092 49	29,649 50	.....	18,442 99
South Vancouver	955,209 55	90,969 79	53,997 43	144,967 22	85,810 84†	.....	59,156 38
Spallumcheen	43,094 38	1,184 90	2,882 16	4,067 06	.....	.....	4,067 06
West Vancouver	105,762 13	9,740 45	9,886 67	19,627 12	7,779 39	.....	11,847 73
Totals	$ 5,033,791 92	$ 250,623 03	$ 305,596 47	$ 556,219 50	$ 299,366 49	$ 3,120 39	$ 259,973 40
Cities forward	11,668,838 08	431,102 18	724,944 25	1,156,046 43	1,140,359 19	102,923 33	118,610 57
Cities and districts	$16,702,630 00	$ 681,725 21	$1,030,540 72	$1,712,265 93	$1,439,725 68	$ 106,043 72	$ 378,583 97

* Includes capital expenditure from current revenue, $19,699.67. † Local improvements.

SUNDRY UTILITIES.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Water and Light.							
Kelowna	$ 106,696 50	$ 53,401 01*	$ 12,121 87	$ 65,522 88	$ 55,351 40	.....	$ 10,171 48
Merritt	56,772 00	22,664 24†	5,671 37	28,335 61	26,870 21	.....	1,465 40
Gas.							
Nelson	50,000 00	14,680 45	3,381 86	18,062 31	13,297 70	.....	4,764 61
Irrigation System.							
Penticton	211,996 05	11,782 37	12,283 73	24,066 10	27,536 29	$ 3,470 19	.....
Irrigation and Domestic Water.							
Summerland	350,796 97	18,117 21	30,394 39	48,511 60	34,642 56	.....	13,869 04
Hydro-electric System.							
Kamloops	347,784 76	14,751 51	31,031 05	45,782 56	41,292 51	.....	4,490 05
Ferries.							
North Vancouver	247,538 39	182,727 50	17,518 86	200,246 36	218,335 95	18,089 59	.....
West Vancouver	62,471 09	49,541 20	12,282 98	61,824 18	59,320 13	.....	2,504 05
Street-railway.							
Nelson	80,264 13	16,688 60	7,228 70	23,917 30	20,517 50	.....	3,399 80
Totals	$1,514,319 89	$384,354 09	$131,914 81	$516,268 90	$497,164 25	$21,559 78	$40,664 43

* Includes capital expenditure from current revenue, $6,795.39.

† Includes capital expenditure from current revenue, $2,794.38.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

TENTH ANNUAL REPORT

OF THE

SUPERINTENDENT OF INSURANCE

FOR THE

PROVINCE OF BRITISH COLUMBIA

1921

(BUSINESS TRANSACTED IN 1920)

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the Tenth Annual Report of the Superintendent of Insurance for the year ended December 31st, 1920.

J. W. DE B. FARRIS,

Attorney-General.

Victoria, B.C., June 30th, 1921.

REPORT OF THE SUPERINTENDENT OF INSURANCE.

DEPARTMENT OF INSURANCE,
VICTORIA, B.C., June 30th, 1921.

The Honourable J. W. de B. Farris,
Attorney-General, Victoria, B.C.

SIR,—The Tenth Annual Report of the Department, covering the year ended December 31st, 1920, is herewith submitted in accordance with the "British Columbia Fire Insurance Act" and the "Insurance Act."

I. "BRITISH COLUMBIA FIRE INSURANCE ACT."

(1.) FIRE INSURANCE COMPANIES.

The year 1920 closed with a further increase in the number of companies licensed under this Act for fire insurance. The total was 132, of which all except two also hold Dominion licences.

The new British companies were: British Crown Assurance Corporation, Limited (a reorganization of a company of a similar name previously licensed under the Act); The British General Insurance Company, Limited; Essex & Suffolk Equitable Insurance Society, Limited; Motor Union Insurance Company, Limited; Railway Passengers Assurance Company; Royal Scottish Insurance Company, Limited; and The Traders & General Insurance Association, Limited.

The Canadian companies were: Canada Security Assurance Company, Canadian Indemnity Company, and Pacific Marine Insurance Company, holding Dominion charters, and the Union Fire and Casualty Company and the Wawanesa Mutual Insurance Company, being Provincial incorporations. The Canada Security Assurance Company was a reorganization of an Alberta company of the same name. The two Provincial companies are not licensed by the Dominion.

Three new companies came from the United States, namely: Caledonian American Insurance Company, Columbia Insurance Company, and The Sterling Fire Insurance Company of Indiana, U.S.A.

Eight of the companies licensed under this Act in 1920 were already licensed under the "Insurance Act."

The only companies which during 1920 ceased to carry on business in the Province were the reorganizations I have mentioned.

A complete list of the companies licensed as at December 31st, 1920, is printed on page 25. and the origin of the various companies is as follows:—

Dominion of Canada	28
Provinces of Canada	7
Great Britain	39
Australia	1
Hong Kong	4
United States	49
France	4
Total	132

There is again a large increase in net premiums for fire insurance, and, although the losses paid are also higher, it is obvious that the business of 1920 was very lucrative. The figures stated in Tables I. and II. indicate that the time is ripe for some reduction of rates in this Province, as the average amount paid for losses during the past five years is only 30 per cent. of the net premiums received. The statistics will be found on pages 29 and 30.

(2.) FIRES.

The salient feature of the fire loss for 1920 is again the high proportion of fires involving a loss of $30,000 or over. I set out particulars of these fires:—

March: West Kootenay District; sawmill; cause, hot bearing	$ 45,000
April: Prince Rupert District; cannery; cause unknown	200,000
April: Rossland; mining property; cause, spark from chimney	50,000
May: North Cowichan District; dwelling; cause unknown	51,000
June: Vancouver; apartment-house; cause unknown	94,000
July: Delta; cannery; cause unknown	185,593
August: Port Coquitlam; conflagration; cause unknown	103,530
August: Port Moody; dry-kiln; cause unknown	119,000
September: Chilliwack; hop-drying plant; cause unknown	56,134
September: New Westminster; dry-kiln; cause, spontaneous combustion	37,662
September: Maple Ridge; shingle-mill; cause unknown	30,000
September: Vancouver-New Westminster District; shingle-mill; cause, hot bearing	100,000
October: Vancouver-New Westminster District; sawmill; cause unknown	34,385
October: Victoria; store; cause, clothes too close to steam-pipe	30,624
November: Vancouver; wharf; cause, unknown	50,000
December: Boundary District; coal-mine; cause, spontaneous combustion	35,000
December: Hazelton District; conflagration; cause unknown	61,136
December: Prince Rupert District; mining property; cause, hot bearing	51,662
December: Vancouver; stores; cause unknown	53,750
Total	$1,388,576

These losses therefore represent more than 50 per cent. of the aggregate loss sustained by the Province as reported to this Department, and were caused by nineteen fires out of a total of 1,182 fires. The percentage for 1919 on the same basis was something over 25. Unfortunately, in more than half the cases the cause of the fire was unknown, but hot bearings and sparks were, as in 1919, responsible for part of the loss. Mill and mine property, too, appears regularly in the list of larger fires, while the latter part of the year, particularly the month of September, seems to be the more fatal. It is impossible to deduce any broad generalization, but it becomes more apparent each year that the efforts to lessen the fire waste should be concentrated primarily on the industrial hazard. By teaching fire-prevention in the factory more good will be done, in my opinion, than by a hundred "clean-up" campaigns at random.

The number of fires reported for the year shows a little decrease, and it is hoped that this tendency will continue, now that the public is beginning to be familiar with the fire menace and its consequences. Although the figures of loss are larger, too much stress should not be laid on this aspect. The *per capita* loss works out at $4.80 for the Province, but, as already pointed out, the main responsibility falls on the industrial hazard. If the nineteen large fires referred to are deducted, the *per capita* loss for 1920 is smaller than that for 1919.

The loss of life was larger than for several years, and five lives were destroyed by the fire which occurred in the Balmoral Apartments at Vancouver in June of last year. That fire taught a terrible lesson and stirred the people of this Province to a profound realization of the danger of fire and how easily it can be avoided by care and an observance of the existing laws. The public was alarmed when the inquiry into the fire exposed conditions which daily involved serious risk to life, and yet were due in no small degree to a failure to comply with enactments designed to prevent such conditions.

The fire-prevention officer of the Department, Mr. J. A. Thomas, has had an extremely busy year, and his services have been more and more in request and, I can safely add, appreciated by all sections of the community. The value of the work he has done needs no argument to prove it, and the only question to be considered is how far it should be extended.

I append extracts from Mr. Thomas's report:—

Fire-prevention.—In the work of fire-prevention there has been a very considerable advance over last year. This is particularly true in some of the larger cities where the fire-prevention work has been thoroughly reorganized and systematic inspection by the officials of the Fire Department is being carried out.

Fires.—In regard to the fire at the Balmoral Apartments mentioned above he says: "The result of this fire and the investigation held before His Honour Mr. Justice Morrison, of the Supreme Court, was that the fire-prevention work of the City of Vancouver was thoroughly reorganized. A large number of fire wardens were appointed and are doing very efficient work throughout the city."

Unorganized Districts.—Considerable work has been done in the unorganized districts this year, notably in the town of Princeton. The great need in these districts is some method whereby money can be raised for fire-prevention purposes.

Fire-escape Act.—The work of assisting the different Fire Chiefs throughout the Province in carrying out the provisions of the Provincial "Fire-escape Act" has been carried on by this Department under your instruction. I find that there is a great need for expert advice in this regard. The local Fire Chiefs and others whose duty it is to enforce the provisions of this Act have not the technical knowledge required.

Excessive Insurance.—During my investigation of fires I have found a number of cases where property was insured far beyond its sound value. It is obvious that this is placing a premium on arson.

Fire Marshal Act.—The necessity for a Fire Marshal Act that will give the Provincial officers authority to enforce reasonable recommendations for fire-prevention throughout the Province, particularly in the unorganized districts where we have no Fire Chief or other official who is qualified to act, is becoming more apparent every year. This is particularly true where there are industrial plants located in the rural municipalities.

II. "INSURANCE ACT."

The number of companies licensed under this Act for insurance business other than fire reached 141 at the end of 1920, as compared with 130 for 1919. The particulars are set forth on page 27.

Eleven of the new companies already held licences under the "British Columbia Fire Insurance Act" and two were reorganizations of licensed companies—namely, the British Crown Assurance Corporation, Limited, and the Canada Security Assurance Company, referred to above.

There were two new British Companies, three Canadian and one Manitoba Company, and seven from the United States.

The Equitable Life Assurance Society of the United States and the Maryland Assurance Company withdrew during the period under review.

In addition to the new licences, fourteen supplementary licences were issued to companies already licensed under the Act for automobile, accident, burglary, forgery, hail, inland marine, inland transportation, marine, robbery, and sickness insurance.

SUMMARY.

Where incorporated.	Dominion Licensees.	Provincial Licensees.	Total.
British Columbia	..	2	2
Canada	40	..	40
Other Provinces of Canada	2	3	5
Great Britain	27	10	37
Australia	1	..	1
New Zealand	..	1	1
Hong Kong	2	2	4
Japan	..	1	1
United States	48	2	50
Totals	120	21	141

The statements of companies not holding a Dominion licence appear on pages 9 to 24.

The statistics for life insurance (pages 40 and 41) set up new records, and the net amount in force in the Province increased to $171,000,000. But while the amount for premiums received took another big stride upwards, the figures for claims made on policies remained practically stationary. The war period and the influenza epidemic have run their course, and the amounts paid out will drop to their former ratio. It would appear that the present year will not approach last year for volume of new business written, and the companies will do well if they can prevent any large percentage of lapses, which unfortunately follow in the train of hard times.

Allusion was made last year to "group" life insurance. Two companies have written a few policies of this kind, covering employees in the Province.

Turning to the miscellaneous forms of insurance (*see* Table XIII., page 41), the companies did not have a good year like the fire insurance companies. While the amount of business done increased, the losses were, with one or two exceptions, heavier. In the case of automobile insurance the premiums were much larger, but the claims paid amounted to nearly 50 per cent. This class included all kinds of damage done to or by motors, and the losses are not perhaps surprising when one regards the number of street accidents alone. In 1920 there were 4,044 accidents reported to the police in Vancouver and 17 persons killed, and in Victoria 63 accidents where persons were injured, involving 2 deaths.

III. GENERAL.

An important conference of the Superintendents of Insurance for various Provinces was held at Winnipeg in October last. Ontario, Manitoba, Saskatchewan, and Alberta were represented, but the official for Quebec was prevented by illness from attending, and I was on my way back from England. The conference was also favoured by some members of the Provincial Commissioners on Uniformity of Law and numerous representatives of insurance interests. It was agreed by all parties that the conference proved a very valuable meeting. The chief subjects on which papers were read and which were discussed were these:—

(1.) Regulation of insurance agents, brokers, and adjusters.
(2.) Fraternal societies.
(3.) Hail insurance.
(4.) Uniform statutory conditions for accident and sickness insurance.
(5.) Model Fire Policy Act.
(6.) Reciprocal insurance.
(7.) Uniform statutory conditions for automobile insurance.
(8.) Uniform law relating to beneficiaries under life-insurance policies.
(9.) Unlicensed insurance.

It is proposed to hold another conference at Quebec in October next, when the Superintendents expect to arrive at definite decisions on some of these matters, so that they can make recommendations to their respective Governments. It is interesting to note that, in regard to subjects 5 and 8, the Commissioners on Uniformity of Law are also at work, and these subjects are in this way tackled from the legal as well as the insurance standpoint.

In accordance with your instructions, legislation relating to the licensing of agents is in course of preparation and will be welcomed by the insurance fraternity; likewise legislation permitting the extension of the fire prevention and inquiry work of this Department will be submitted to you in time for the November session of the Legislature. It will not, however, be possible by that date to revise the Insurance Acts, and indeed it would be better to await the holding of the conference in October, so that this Province can act with the others.

The recent decision of the Privy Council in the cases of Great West Saddlery Co. *v* the King, etc. (a consolidated appeal), confirms the jurisdiction claimed by the Provinces over outside companies, and the principle is applicable to insurance legislation.

On the eve of a change in the head of this Department, I may be permitted to express the hope that during my tenure of office as Superintendent I have given satisfactory service to yourself and the public. I have the honour to be,

Sir,

Your obedient servant,

H. G. GARRETT,

Superintendent of Insurance.

APPENDIX.

INSURANCE OTHER THAN FIRE INSURANCE.

Annual Statements of Provincial Licensees for the Year ended December 31st, 1920.

BRITISH COLUMBIA PLATE GLASS INSURANCE COMPANY.

Head Office—Vancouver, B.C.

Directors.

Walter E. Graveley.
A. F. Beasley.
H. W. Chamberlain.
F. M. Chaldecott.
A. G. Thynne.

Alfred Farmer, Secretary.

Amount deposited with the Government of British Columbia: British Columbia Inscribed Stock, £200; Township of Richmond bonds, $5,000; Dominion of Canada War Loan bonds, $1,000; total (par), $6,972.22.

Authorized capital	$25,000
Amount subscribed	9,600
Amount paid up	3,840

Statement for the Year ended December 31st, 1920.

Assets.

Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	$17,128 18
Cash on deposit to the Company's credit and not drawn against on December 31st, 1920	1,787 36
Premiums uncollected (net commissions deducted)	4,200 00
Interest due or accrued and unpaid	100 80
Total assets	$23,216 34

Liabilities.

Total amount of claims or losses unpaid	$ 910 14
Total reserve of unearned premiums, $26,566.57; carried out at 80 per cent. thereof	21,252 56
Total amount of liabilities	$22,162 70
Capital stock paid up	3,840 00
Total of liabilities and paid-up capital	$26,002 70
Excess of assets over such total	$ 2,786 36

Receipts.

Net cash received for premiums	$28,116 64
Cash received for interest	905 97
Cash from all other sources	357 95
Total receipts	$29,380 56

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 9,840 75
„ for statutory assessment and licence fees	242 49
„ „ rent and taxes	259 41
„ „ salaries, directors' and auditors' fees	650 00
„ „ printing, stationery, and advertising	99 14
„ „ other expenses	27 50
Total expenses of management	$11,119 29
Amount paid for losses occurring during the year	16,000 13
Cash paid for dividends	960 00
Cash paid for debentures, mortgages, etc. (not extended), $1,990.	
Cash paid for other expenditure	27 12
Total expenditure	$28,106 54

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid.
H. Bell-Irving	Vancouver	5	$ 500	$ 200
W. E. Graveley	"	5	500	200
A. Mc. Creery	"	1	100	40
A. F. Beasley	Victoria	7	700	280
T. O. Richards	Vancouver	1	100	40
H. W. Chamberlin	"	5	500	200
H. C. Ackroyd	"	1	100	40
D. B. Charleson	"	1	100	40
W. J. Albutt	"	17	1,700	680
R. Martin	"	1	100	40
J. Rogers	"	2	200	80
A. G. Thynne	"	35	3,500	1,400
F. M. Chaldecott	"	5	500	200
C. E. Hope	"	2	200	80
T. A. Blythe (estate of)	"	3	300	120
P. W. Charleson	"	5	500	200
		96	$9,600	$3,840

CANTON INSURANCE OFFICE, LIMITED.

Head Office—Victoria, Hong Kong.

Consulting Committee.

D. G. M. Bernard.
A. M. Bowes-Smith.
The Hon. Sir Paul Chater.
E. J. Chapman.
Sir Robert Ho Tung.
T. E. Pearce.
H. W. Sassoon.
H. P. White.

General Agents.

Messrs. Jardine, Matheson & Co., Limited, Hong Kong.

Capital authorized and subscribed	$2,500,000
Amount paid up	1,000,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

Cash in hand, in transit, on current account, and fixed deposits with banks		$ 870,076 10
Gold investments—		
British, Indian, and Colonial Government bonds and stocks		3,738,579 57
Foreign Government loans		533,447 52
British, Colonial, and Foreign railway and port trust bonds and stocks		226,549 04
Silver investments—		
Hong Kong Government 6% War Loan of 1916		100,000 00
Mortgage loans and debentures		1,595,045 04
Other investments		473,920 99
Agency balances		1,059,913 79
Accounts receivable		186,534 40
Total assets		$8,784,066 45

Liabilities.

Capital, 10,000 shares of $250 each = $2,500,000, of which $100 per share has been paid up		$1,000,000 00
Reserve Fund		1,600,000 00
Reinsurance Fund		1,316,964 22
Investment and Exchange Fluctuation Account		3,787 44
Underwriting Suspense Account		1,029,205 45
Uncollected dividends		23,130 00
Accounts payable		152,479 86
Working Account, 1919	$1,043,127 43	
Less interim dividend at $18 per share paid on May 25th, 1920..	180,000 00	
		863,127 43
Working Account, 1920		2,795,372 05
Total liabilities		$8,784,066 45

NOTE.—Dollars in Hong Kong currency, with sterling exchange at 3s. 1½d.

GREAT NORTH INSURANCE COMPANY.

Head Office—Calgary, Alberta.

Directors.

W. J. Walker, President.
Hon. A. C. Rutherford.
Hon. F. A. Walker.
J. K. McInnis.
Geo. H. Ross.
C. E. Montgomery.
Hon. P. E. Lessard.

M. L. Kern, Assistant Secretary.

Amount deposited with the Government of British Columbia: $5,000 in cash.

Authorized capital	$500,000
Amount subscribed	221,200
Amount paid up in cash	112,810

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

Cash value of mortgages, exclusive of interest	$ 18,000 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	17,265 48
Actual cash on hand at Head Office	924 94
Cash on deposit to the Company's credit and not drawn against on December 31st, 1920	14,898 76
Agents' balances and premiums uncollected	35,235 67
Bills receivable less than one year overdue	33,815 15
Premium notes	25,729 23
Calls on capital stock outstanding in course of collection	9,350 00
Reinsurance collectable on unadjusted losses	3,901 25
Due from other companies for reinsurance on losses already paid	18,639 82
Amount of all other assets	3,786 10
Office furniture (not extended), $4,300.	
Total assets	$181,546 40

Liabilities.

Claims or losses adjusted	$ 600 00
Claims or losses in suspense, or supposed, or reported	9,400 00
Total amount of losses or claims unpaid	$ 10,000 00
Live-stock reserve, 50 per cent. of premiums in force	15,144 68
Total reserve of unearned premiums for all outstanding risks	22,185 32
Amount due for commission	825 93
Amount of all other liabilities	54,700 92
Total amount of liabilities	$102,856 85
Capital stock paid up	112,810 00
Total amount of liabilities and paid-up capital	$215,666 85
Excess of liabilities	$ 34,120 45

Receipts.

Net premiums received in cash	$128,636 31
Cash received for interest	1,282 25
Cash received for calls on capital stock	8,422 10
Cash received for debentures, mortgages, etc. (not extended), $20,000.	
Decrease in reinsurance reserve	4,803 60
Total receipts	$143,144 26

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 19,707 60
„ for statutory assessment and licence fees	9,187 93
„ „ other expenses	16,829 95
Total expenses of management	$ 45,725 48
Net amount paid for losses occurring prior to 1920	10,493 54
Net amount paid for losses occurring during 1920	49,097 55
Cash paid for other expenditure	8,961 23
Cash paid for mortgages, debentures, etc. (not extended), $200.	
Total expenditure	$114,277 80

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, cash	$ 5,000 00
Other assets	242 22
Liabilities	465 19
Premiums written, less return premiums	648 00
Losses incurred, net	300 00
Losses paid, net	300 00
Net amount at risk	9,650 00

LONDON & PROVINCIAL MARINE & GENERAL INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Edwin Gray, Chairman. Richard de Neufville.
James W. Arbuthnot. Herbert E. Secretan.
James Hamilton. William M. Strachan.

Irving H. Cortazzi, Secretary.

Authorized capital	£1,000,000
Amount subscribed	1,000,000
Amount paid	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

		£ s. d.
By Mortgages—		
On property within the United Kingdom	£14,000 0 0	
On property out of the United Kingdom	26,133 18 1	
On policies of life assurance	3,400 0 0	
		43,533 18 1
Investments (valued as at December 31st, 1919; investments made since that date are valued at cost)		1,217,634 4 2
Due from other companies and agents		91,347 14 2
Interest accrued but not payable		11,630 6 5
Cash on deposit at bankers and in hand		36,955 10 0
Sundry debtors		2,607 11 9
Lease and furniture, Fire Department		658 15 6
Policy stamps in hand		971 17 0
Total assets		£1,405,339 17 1

Liabilities.

	£	s.	d.
To Authorized capital, 100,000 shares of £10 each = £1,000,000.			
Paid up capital, 100,000 shares of £10, £1 paid	100,000	0	0
Marine Insurance Fund	572,823	14	7
Fire and Accident Insurance Fund	5,887	16	3
Profit and Loss Account	37,685	6	6
General Reserve Fund	200,000	0	0
Investment Reserve Fund	125,000	0	0
Claims admitted or intimated but not paid—			
Marine £7,884 4 7			
Fire 2,142 19 6			
	10,027	4	1
Outstanding charges and reserve for Government taxes	278,287	1	10
Due to other companies and agents	72,951	18	2
Bills payable	2,663	4	6
Unclaimed dividends	13	11	2
Total liabilities	£1,405,339	17	1

MARITIME INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

Edward Hatton Cookson, Chairman.
Johan Frederick Caroe.
William Charles Aikman.
James Allan Cook.
Harold Sumner.
Jasper Muirhead Wood.

John Crosby Nicholson, Secretary.

Authorized capital	£1,000,000
Amount subscribed	500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

	£	s.	d.
By Investments	1,205,946	19	0
Sundry debtors	182,659	17	0
Interest and dividends accrued, but not payable until after Dec. 31st, 1920	5,213	13	11
Cash on deposit, in hand, and on current account	116,379	6	6
Total assets	£1,510,199	16	5

Liabilities.

	£	s.	d.
To Shareholders' capital paid up	100,000	0	0
General Reserve Fund	200,000	0	0
Underwriting Fund	765,144	17	0
Profit and Loss Account	178,341	3	10
	£1,243,486	0	10
Sundry creditors	266,713	15	7
Total liabilities	£1,510,199	16	5

NATIONAL PLATE GLASS INSURANCE COMPANY.

Head Office—Winnipeg, Man.

Amount deposited with the Government of British Columbia: City of Salmon Arm bonds, $5,000; City of Nelson bonds, $300; City of Alberni bonds, $210; total (par), $5,510.

No business transacted in British Columbia during 1920.

NEW ZEALAND INSURANCE COMPANY, LIMITED.

Head Office—Auckland, New Zealand.

No report received from this company.

THE OCEAN MARINE INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Hon. Charles Napier Lawrence, Chairman.
Sir Alex. Drake Kleinwort, Bt.
Herbert Robinson Arbuthnot.
Harry Cunningham Brodie.
James Blyth Currie.
Philipp Moritz Deneke.
Maurice Ruffer.
Philip Secretan.
David Nairn Shaw.

H. T. Russell Ross, Secretary.

Capital authorized and subscribed £1,000,000
Amount paid up 100,000

Statement for the Year ended December 31st, 1920.

Assets.

	£	s.	d.
British Government securities	492,746	15	0
Public Boards, United Kingdom	25,825	0	0
Municipal and county securities, United Kingdom	40,495	0	0
Indian and Colonial Government securities	68,205	0	0
Colonial municipal securities	20,775	0	0
Foreign Government securities	134,248	17	1
Foreign municipal securities	74,856	18	4
Guaranteed and other Indian railway stock	11,225	0	0
Indian Government railway annuities	9,275	0	0
Railway and other debentures, home and foreign	151,879	5	0
Railway preference and guaranteed stocks	7,531	5	0
Railway and ordinary stocks	9,901	0	0
Loans on stocks and shares	233,437	10	0
	£1,280,401	10	5
Freehold premises	124,000	0	0
	£1,404,401	10	5
Agents' balances	142,942	9	11
Outstanding premiums, etc.	143,048	16	9
Bills receivable	115	10	7
Interest accrued but not yet payable	11,426	4	7
Policy stamps on hand	465	0	10
Cash—			
On deposit	57,390	6	1
In hand and on current account	6,053	4	11
Total assets	£1,765,843	4	1

Liabilities.

	£	s.	d.
Capital, 40,000 shares of £25, paid up £2 10s. per share (now vested in the North British and Mercantile Insurance Company)	100,000	0	0
Marine Fund—			
Reserve £500,000 0 0			
Profit and loss 231,333 9 2			
	731,333	9	2
Balance of Underwriting Account, 1919	177,125	18	0
Balance of Underwriting Account, 1920	376,742	3	10
Sundry creditors	380,641	13	1
Total liabilities	£1,765,843	4	1

THE RELIANCE MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

Gilbert W. Fox, Chairman.
J. U. Hodgson.
George Atherton.
Lieut.-Col. F. R. S. Balfour.
Oswald Dobell.
The Hon. Evelyn Hubbard.
R. A. Love.
J. J. Ritchie.
R. W. Sharples.

F. R. Edwards, Secretary.

Authorized capital	£500,000
Amount subscribed	500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

	£	s.	d.
By Investments at market value £534,365 16 5			
Less loans on war stock 10,000 0 0			
	524,365	16	5
Policy stamps	136	18	1
Interest accrued but not received	4,319	8	1
Accounts due to the Company for premiums, salvages, etc.	174,077	3	10
Cash at bankers and in hand	3,891	18	7
Total assets	£706,791	5	0

Liabilities.

	£	s.	d.
To Capital, 50,000 shares at £10 per share, £500,000; paid up, £2 per share	100,000	0	0
Reserve Fund	200,000	0	0
Balance of Profit and Loss Account £47,715 9 5			
Less interim dividend paid November 30th, 1920 10,500 0 0			
	37,215	9	5
Balance of Marine Account, 1920	146,310	0	3
Fire Insurance Fund	82,550	3	9
Suspense and Special Reinsurance Accounts	47,356	6	2
Accounts due by the Company	93,336	13	8
Dividends unpaid	22	11	9
Total liabilities	£706,791	5	0

ROYAL PLATE GLASS INSURANCE COMPANY OF CANADA.

Head Office—Vancouver, B.C.

Directors.

Dr. D. H. Wilson. R. W. Harris.
J. P. Nicolls. A. P. Bogardus.
W. H. Malkin. C. A. Wickens.

Edgar S. Smith, Secretary.

Amount deposited with the Government of British Columbia: Deposit receipt of Canadian Bank of Commerce, $125; Dominion War Loan bonds (par), $5,000; total, $5,125.

Authorized capital	$25,000
Amount subscribed	10,000
Amount paid up	2,750

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

Cash value of mortgages, exclusive of interest	$ 2,250 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	7,060 73
Cash on deposit to the Company's credit and not drawn against on December 31st, 1920	218 89
Agents' balances and premiums uncollected	1,868 89
Interest due or accrued and unpaid	54 76
Commissions paid in advance	1,347 21
Total assets	$12,800 48

Liabilities.

Claims or losses adjusted	$ 628 76
Reserve of unearned premiums	4,490 77
Amount of all other liabilities	71 74
Total amount of liabilities	$ 5,191 27
Capital stock paid up	2,750 00
Total amount of liabilities and paid-up capital	$ 7,941 27
Excess of assets over such total	$ 4,859 21

Receipts.

Net cash received for premiums	$ 4,925 22
Cash received for interest	731 48
Total receipts	$ 5,656 70

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 1,477 53
„ for interest, discount, and exchange	2 01
„ „ statutory assessment and licence fees	32 18
„ „ auditor's fees	45 00
„ „ other expenditure	52 67
Total expenses of management	$ 1,609 39
Amount paid for losses occurring prior to 1920	842 94
Amount paid for losses occurring during 1920	2,155 00
Total expenditure	$ 4,607 33

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid.
A. P. Bogardus	Vancouver	10	$ 1,000	$ 275 00
D. H. Wilson	"	14	1,400	385 00
R. W. Harris	"	14	1,400	385 00
W. H. Malkin	"	14	1,400	385 00
C. A. Wickens	"	8	800	220 00
P. G. Mason	"	8	800	220 00
J. P. Nicolls	"	5	500	137 50
I. Douglas	Boston, U.S.A.	12	1,200	330 00
M. Douglas	" "	5	500	137 50
R. D. Douglas	Binghampton, U.S.A.	5	500	137 50
N. S. Douglas	" "	5	500	137 50
		100	$10,000	$2,750 00

STANDARD MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

F. W. Pascoe Rutter, Chairman. — Walter B. Duckworth.
Jas. W. Alsop. — A. Percy Eccles.
John H. Clayton. — James G. Nicholson.

N. B. Barnes, Secretary.

Capital authorized and subscribed £500,000
Amount paid up 100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

	£	s.	d.
Investments and loans	917,709	9	4
Cash at bankers and in hand	83,180	9	0
Bills receivable	622	19	8
Sundry debtors	561,949	18	6
Accrued interest	13,965	10	9
Stamps in hand	560	1	9
Total assets	£1,577,988	9	0

Liabilities.

	£	s.	d.
Capital, 25,000 shares of £20 each, £4 per share paid	100,000	0	0
Reserve Fund	500,000	0	0
Reserve for unexpired risks	193,270	0	0
Provision for income-tax, 1920, and excess-profits duty, 1917 and 1918	128,713	15	0
Provision for corporation-tax	5,650	0	0
Balance, Profit and Loss Account	121,550	6	5
Dividend for the year 1920	56,000	0	0
Bills payable	1,499	13	7
Claims outstanding	166,808	0	0
Sundry creditors	304,496	14	0
Total liabilities	£1,577,988	9	0

THE TOKIO MARINE & FIRE INSURANCE COMPANY, LIMITED.

Head Office—Tokio, Japan.

Directors.

M. Suyenobu, Chairman.
K. Kagami.
H. Hirao.
T. Abe.
S. Sasaki.
H. Shoda.
Baron K. Sonoda.

Capital authorized and subscribed ..... Y. 15,000,000
Amount paid up 7,500,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

	Yen sen.
Capital unpaid	7,500,000 00
Office premises, etc.	1,665,000 00
Japanese Government securities	10,144,569 25
British Government securities	3,162,375 00
United States Government securities	2,142,959 16
French Government securities	485,000 00
Canadian Government securities	83,673 47
Japanese and foreign municipal bonds	1,266,999 18
United States railway and other bonds and shares	1,858,958 95
Bonds and debentures of various companies	4,669,080 00
Shares in various companies	11,328,803 97
Loans on mortgages, etc.	22,008,472 51
Accounts due to the Company	873,797 80
Cash at bankers on deposit and current accounts and in hand	17,497,276 59
Total assets	84,686,965 88

Liabilities.

		Yen sen.
Share capital		15,000,000 00
Legal Reserve Fund		3,750,000 00
Underwriting Fund—		
Underwriting Reserve	Y. 41,600,000 00	
Underwriting Suspense	9,757,985 12	
		51,357,985 12
Buildings Depreciation Fund		85,000 00
Staff Pension Fund		438,575 01
Accounts due by the Company		4,939,295 74
Profit and Loss Account		9,116,110 01
Total liabilities		84,686,965 88

WAWANESA MUTUAL INSURANCE COMPANY.

Head Office—Wawanesa, Man.

Directors.

S. H. Henderson.
E. H. Dewart.
S. Reid.
M. McKellar.
J. M. Ross.
R. Wallace.
A. J. Elliott.

A. F. Kempton, Secretary.

Amount deposited with the Government of British Columbia: Dominion War Loan bonds (par), $25,000.

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

Cash value in real estate, less encumbrances	$ 16,763 91
Cash value of bonds, debentures, securities, etc.	291,900 00
Cash on hand at Head Office	2,179 28
Cash on deposit to the Company's credit and not drawn against on December 31st, 1920	121,196 51
Agents' balances	472 89
Amount unpaid of instalments for year 1920	6,961 42
Amount unpaid on prior instalments (not extended), $31,924.83.	
Amount unpaid of assessments which were levied during 1920	47,436 04
Amount unpaid of assessments levied in prior years	15,030 94
Amount unpaid of assessments levied in prior years (not extended), $83,605.24.	
Amount of premium notes in force after deducting all payments thereon and assessments levied (not extended), $1,326,098.44.	
Amount of interest due and accrued	2,614 90
Office furniture, etc. (not extended), $4.671.78.	
Total assets	$504,554 99

Liabilities.

Amount required to reinsure all outstanding risks taken on cash system, being 50 per cent. of gross premiums on all cash system policies in force at December 31st, 1920	$109,466 98
Total liabilities	$109,466 98

Receipts.

Cash received as fixed payments due in 1920	$ 12,236 69
„ as fixed payments due in prior years	8,412 13
„ for assessments levied in 1920	169,939 51
„ by Company for assessments levied in years prior to 1920	31,353 17
„ for premiums on cash system	94,623 30
„ for interest during 1920	14,670 94
Total receipts	$331,235 74

Expenditure.

Cash paid for commissions or allowances of any kind to agents		$ 54,048 87
„ „ law costs		43 06
„ „ fuel and light		1,348 61
„ „ investigation and adjustment of claims		4,940 53
„ „ statutory assessment and licence fees		385 00
„ „ travelling expenses		3,888 70
„ „ taxes		3,482 95
„ „ salaries, directors' and auditors' fees		35,738 87
„ „ printing, stationery, and advertising		8,017 88
„ „ postage, telegrams, and express		5,606 31
„ „ other expenses		3,192 63
Total expenses of management		$120,693 41
Cash paid for losses which occurred prior to 1920		128,612 50
„ „ rebate, abatement, and returned premiums		5,064 32
„ „ purchase of debentures, mortgages, etc. (not extended), $45,646.		
„ „ other expenditure		901 89
Total expenditure		$254,822 12

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, Dominion War Loan bonds (par)		$ 25,000 00
Other assets		*Nil*
Liabilities		405 68
Premium notes in force		12,679 55
Cash received—		
Assessments	$595 95	
Premiums	811 36	
		1,407 31
Losses incurred, net		*Nil*
Losses paid, net		*Nil*
Net amount at risk		709,414 00

THE WESTERN EMPIRE LIFE ASSURANCE COMPANY.

Head Office—Winnipeg, Man.

Directors.

William Smith, President.	S. D. Hannah.
R. W. Graig.	G. N. Broatch.
Dr. A. J. Fraser.	G. E. Graham.
Brig.-Gen. F. M. Dyer, C.M.G., D.S.O.	F. D. Byers.

F. C. O'Brien, Secretary.

Amount deposited with the Government of British Columbia: 27 Dominion Victory Loan bonds (par), $27,000.

Authorized capital	$1,000,000 00
Amount subscribed	1,000,000 00
Called capital	250,000 00
Amount paid up in cash	199,666 05

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

Cash value of real estate, less encumbrances	$ 15,319 60
Cash value of mortgages, exclusive of interest	71,362 03
Loans, other than those secured by mortgages	30,910 55
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	250,230 00
Actual cash on hand at Head Office	4,877 37
Cash on deposit to the Company's credit and not drawn against on December 31st, 1920	10,237 76
Agents' balances	61,363 30
Interest due or accrued and unpaid	12,451 73
Calls on capital stock outstanding in course of collection	50,333 95
Premium on stock in course of collection	111,910 10
Amount of all other assets	29,475 07
Office furniture (not extended), $4,644.60.	
Total assets	$648,471 46

Liabilities.

Claims or losses adjusted	$ 3,402 68
Amount of unpaid loans	34,500 00
Reinsurance reserve for life-insurance contracts in force	340,627 00
Amount due for advertising	319 02
Amount of all other liabilities	4,152 25
Total amount of liabilities	$383,000 95
Capital stock paid up in cash	199,666 05
Total of liabilities and paid-up capital	$582,667 00
Excess of assets over such total	$ 65,824 46

Receipts.

Net premiums received in cash	$130,759 48
Cash received for interest	27,530 36
Cash received for calls on capital stock	45,970 85
Cash received for debentures, mortgages, and other securities (not extended), $33,769.36.	
Cash from all other sources	11,484 48
Total receipts	$215,745 17

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 30,633 47
„ for law costs	591 66
„ „ medical examiners' fees	4,454 60
„ „ interest, discount, and exchange	6,315 27
„ „ statutory assessment and licence fees	2,174 01
„ „ travelling expenses	1,235 00
„ „ rent and taxes	1,800 00
„ „ salaries, directors' and auditors' fees	17,341 00
„ „ printing, stationery, and advertising	5,456 54
„ „ postage, telegrams, and express	1,339 90
„ „ other expenses	11,378 90
Total expenses of management	$ 82,720 35
Amount paid for losses occurring prior to 1920	$ 9,531 50
Amount paid for losses occurring during 1920	16,536 90
Cash paid for dividends	151 43
Cash paid for debentures, mortgages, and other securities (not extended), $133,284.47.	
Cash paid for other expenditure	664 00
Total expenditure	$109,604 18

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, Victory Loan bonds (par)	$ 27,000 00
Assets (real estate, $15,319.60; mortgages, $12,400; loans, $1,473.90; cash, $3,138.12; agents' balances, $4,048.50; interest, $836.63; premium on stock, $100; automatic loans, $1,490.60)	65,807 35
Liabilities	18,347 50
Premiums received	12,870 44
Losses incurred, net	1,000 00
Losses paid, net	3,500 00
Net amount at risk	395,650 00

THE WORLD MARINE & GENERAL INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Sir Ivor Philipps, K.C.B., D.S.O., M.P., Chairman.
Herbert Ballard. A. R. Marshall.
Norman S. Douglass. J. Robertson.
John Godwin. The Hon. J. C. Maxwell Scott.
Sir John B. Wimble, K.B.E.
Irving H. Cortazzi, Secretary.

Capital authorized and subscribed £250,000
Amount paid up 100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1920.

Assets.

		£	s.	d.
By Investments at cost		1,126,766	3	2
Due from other companies and agents		99,446	6	11
Outstanding premiums		35,205	6	1
Interest accrued but not payable		7,715	17	11
Cash—				
On deposit	£20,000 0 0			
In hand and on current account	13,326 9 5			
		33,326	9	5
Policy stamps in hand		873	4	6
Total assets		£1,303,333	8	0

Liabilities.

		£	s.	d.
To Capital authorized, 50,000 shares of £5 each = £250,000.				
Capital issued, 50,000 shares at £5 each, £2 paid		100,000	0	0
General Reserve Fund		200,000	0	0
Fire Insurance Fund		64,628	14	6
Marine Insurance Fund		534,371	14	4
Investment Reserve Fund		83,000	0	0
Profit and Loss Account		30,132	12	3
		£1,012,133	1	1
Claims admitted or intimated but not paid, fire		3,532	3	11
Outstanding charges and reserve for Government taxes		253,946	16	0
Due to other companies and agents		33,664	19	8
Bills payable		33	14	4
Unclaimed dividends		22	13	0
Total liabilities		£1,303,333	8	0

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1920.

Name of the Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to June 30th, 1921.)
The Acadia Fire Insurance Company, Halifax, N.S.	F. W. Rounsefell, Vancouver.
Aetna Insurance Company, Hartford, Conn.	J. E. Kinsman, Victoria.
Agricultural Insurance Company, Watertown, N.Y.	J. J. Banfield, Vancouver.
Alliance Assurance Company, Limited, London, England	W. A. Anderson and H. Miskin, Vancouver.
Alliance Insurance Company of Philadelphia	C. N. Corwin, Vancouver.
American Alliance Insurance Company, New York, N.Y.	O. D. Lampman, Vancouver.
American Central Insurance Company, St. Louis, Missouri	D. W. Campbell, Victoria.
American Equitable Assurance Company of New York, N.Y.	C. G. Hobson, Vancouver.
Atlas Assurance Company, Limited, London, England	John S. Gall, Vancouver.
Beaver Fire Insurance Company, Winnipeg, Man.	Waghorn, Gwynn & Co., Ltd., Vancouver.
Boston Insurance Company, Boston, Mass.	E. C. Jahour, Vancouver.
British America Assurance Company, Toronto, Ontario	P. R. Brown, Victoria.
British Colonial Fire Insurance Company, Montreal, Que.	E. B. McDermid, Vancouver.
British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver.
The British General Insurance Co., Ltd., London, England	J. H. Gillespie, Victoria.
British North Western Fire Insurance Company, Toronto, Ont.	K. G. McCandless, Vancouver.
British Traders' Insurance Company, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Caledonian American Insurance Co., New York, N.Y.	Fred Burgess, Vancouver.
Caledonian Insurance Company, Edinburg, Scotland	Fred Burgess, Vancouver.
California Insurance Company, San Francisco, Cal.	A. W. Ross, Vancouver.
Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver.
Canada National Fire Insurance Company, Winnipeg, Man.	R. W. Perry, Victoria.
Canada Security Assurance Co., Toronto, Ont.	J. J. Banfield, Vancouver.
The Canadian Indemnity Co., Winnipeg, Man.	A. McC. Creery.
Canadian Fire Insurance Company, Winnipeg, Man.	F. C. Paterson, Victoria.
‡The Canadian Surety Company, Toronto, Ont.	Wm. Savage, Vancouver.
Car & General Insurance Corporation, Limited, London, Eng.	J. H. Lawson, Vancouver.
The Century Insurance Company, Limited, Edinburgh, Scotland	Thos. W. Greer, Vancouver.
The China Fire Insurance Company, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Citizens Insurance Company of Missouri, St. Louis, Mo.	Chas. H. Macaulay, Vancouver.
Columbia Insurance Co., Jersey City, N.J.	F. W. Rounsefell, Vancouver.
Commercial Union Assurance Company, Limited, London, England	A. W. Ross, Vancouver.
Commercial Union Fire Insurance Company of New York	A. W. Ross, Vancouver.
Connecticut Fire Insurance Company, Hartford, Conn.	Robt. H. Swinerton, Victoria.
Continental Insurace Compay, New York, N.Y.	W. A. Lawson, Vancouver.
Dominion Fire Insurance Company, Toronto, Ont.	G. H. L. Hobson, Vancouver.
The Dominion of Canada Guarantee & Accident Insurance Company, Toronto, Ont.	J. C. Stuart, Vancouver.
The Eagle, Star & British Dominions Insurance Co., Ltd., London, England.	R. J. Loewen and R. G. Harvey, Vancouver.
Employers Liability Assurance Corporation, Limited, London, Eng.	Jas. A. Young.
Equitable Fire & Marine Insurance Company, Providence, R.I.	A. M. Pound, Vancouver.
Essex and Suffolk Equitable Insurance Society, Ltd., London, Eng.	John G. Elliott, Victoria.
Fidelity Phenix Fire Insurance Company, New York, N.Y.	Arthur Coles, Victoria.
Fire Association of Philadelphia, Philadelphia, Pa.	Leeming Bros., Ltd., Victoria.
The Fire Insurance Company of Canada, Montreal, Que.	C. G. Hobson, Vancouver.
Fireman's Fund Insurance Company, San Francisco, Cal.	E. D. Todd, Victoria.
Firemen's Insurance Company of Newark, New Jersey	C. B. Whitney, Vancouver.
General Accident Assurance Company of Canada, Toronto, Ont.	George Rorie, Vancouver.
General Accident Fire & Life Assurance Corporation, Limited, Perth, Scotland	E. J. Enthoven, Vancouver.
General Fire Assurance Company, Paris, France	A. W. McLeod, Vancouver.
Girard Fire & Marine Insurance Company, Philadelphia, Pa.	Richard R. Smith, Vancouver.
Glens Falls Insurance Company, Glens Falls, N.Y.	J. C. Thorn, Vancouver.
Globe & Rutgers Fire Insurance Company, New York, N.Y.	A. McC. Creery, Vancouver.
Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver.
Great American Insurance Company, New York, N.Y.	S. Burke, Vancouver.
Guardian Assurance Company, Limited, London, England	W. S. Day, Victoria.
Guardian Insurance Company of Canada, Montreal, Que.	R. G. Heddle, Vancouver.
Hartford Fire Insurance Company, Hartford, Conn.	George Allan Kirk, Victoria.
Home Insurance Company, New York, N.Y.	H. W. Dyson, Vancouver.
Hudson Bay Insurance Company, Montreal, Que.	F. W. Walker, Vancouver.
†Imperial Guarantee & Accident Insurance Company of Canada, Toronto, Ont.	Donald Cramer, Vancouver.
Imperial Underwriters Corporation of Canada, Toronto, Ont.	A. Waring Giles, Vernon.
Insurance Company of North America, Philadelphia, Pa.	C. N. Corwin, Vancouver.
The Insurance Company of the State of Pennsylvania, Philadelphia, Pa.	H. A. Robertson, Vancouver.
Law, Union & Rock Insurance Company, Limited, London, England	Wm. Thompson, Vancouver.
Liverpool & London & Globe Insurance Company, Limited, Liverpool, England	R. C. Hall, Victoria.
Liverpool-Manitoba Assurance Company, Montreal, Que.	L. U. Conyers, Victoria.
†London & Lancashire Guarantee & Accident Company of Canada, Toronto, Ont.	Wm. Thompson, Vancouver.
London & Lancashire Insurance Company, Ltd., Liverpool, Eng.	Wm. Thompson, Vancouver.
London Assurance Corporation, London, England	Harold B. Girdwood, Victoria.
London Guarantee & Accident Co., Ltd., London, England	J. H. Watson, Vancouver.
London Mutual Fire Insurance Company of Canada, Toronto, Ont.	Christopher G. Hobson, Vancouver.
Marine Insurance Company, Limited, London, England	W. W. Johnston, Vancouver.
Mechanics & Traders Insurance Company, New Orleans, La.	W. S. Holland, Vancouver.
Mercantile Fire Insurance Company, Waterloo, Ont.	Wm. Thompson, Vancouver.
Merchants Fire Assurance Corporation of New York, N.Y.	C. G. Hobson, Vancouver.
Millers National Insurance Company, Chicago, Ill.	C. G. Hobson, Vancouver.
The Motor Union Insurance Co., Ltd., London, England	W. W. Johnston, Vancouver.
Mount Royal Assurance Company, Montreal, Que.	C. G. Hobson, Vancouver.
National Ben Franklin Fire Insurance Company, Pittsburgh, Pa.	J. H. Johnston, Victoria.

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1920—*Continued.*

National Benefit Assurance Co., Ltd., London, England	Dale & Company, Limited, Vancouver.
National Fire Insurance Company of Hartford, Hartford, Conn.	H. T. Barnes, Victoria.
The Nationale Fire Insurance Company, Paris, France	C. G. Hobson, Vancouver.
National Union Fire Insurance Company, Pittsburgh, Pa.	E. E. Rand, Vancouver.
Newark Fire Insurance Company, Newark, N.J.	F. W. Walker, Vancouver.
New Hampshire Fire Insurance Co., Manchester, N.H.	E. L. Jahour, Vancouver.
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver.
Niagara Fire Insurance Company, New York, N.Y.	D. Leeming, Victoria.
§The North American Accident Insurance Co., Montreal, Que.	J. Edward Sears, Vancouver.
North British & Mercantile Insurance Company, Limited, London, England	R. H. Budd, Vancouver.
North Empire Fire Insurance Company, Winnipeg, Man.	John W. Wilson, Vancouver.
Northern Assurance Company, Limited, London, England	Bernard C. Mess, Victoria.
North West Fire Insurance Company, Winnipeg, Man.	Chas. H. C. Payne, Victoria.
Northwestern Mutual Fire Association, Seattle, Wash.	N. B. Whitley, Vancouver.
Northwestern National Insurance Company, Milwaukee, Wis.	W. B. Blane, Vancouver.
Norwich Union Fire Insurance Society, Limited, Norwich, Eng.	B. S. Heisterman, Victoria.
Ocean Accident & Guarantee Corporation, Limited, London, Eng.	John R. Hannah, Vancouver.
Occidental Fire Insurance Company, Winnipeg, Man.	A. E. Short, Vancouver.
Pacific Coast Fire Insurance Company, Vancouver, B.C.	Thos. W. Greer, Vancouver.
The Pacific Marine Insurance Co., Vancouver, B.C.	Leslie H. Wright, Vancouver.
Palatine Insurance Company, Limited, London, England	A. W. Ross, Vancouver.
The Phenix Fire Insurance Company of Paris, France	J. A. Griffith, Victoria.
Phoenix Assurance Company, Limited, London, England	F. W. Rounsefell, Vancouver.
The Phoenix Insurance Company, Hartford, Conn.	Arthur E. Haynes, Victoria.
Providence Washington Insurance Company, Providence, R.I.	Richard W. Douglas, Vancouver.
Provincial Insurance Co., Ltd., Bolton, England	W. B. Blane, Vancouver.
Quebec Fire Assurance Company, Quebec, Que.	Wm. Thompson, Vancouver.
Queen Insurance Company of America, New York	Rithet Consolidated, Limited, Victoria.
Queensland Insurance Company, Limited, Sydney, Australia	C. Gardner-Johnson, Vancouver.
Railway Passengers Assurance Co., London, England	P. H. Grant, Vancouver.
Royal Exchange Assurance, London, England	H. G. Lawson, Jr., Victoria.
Royal Insurance Company, Limited, Liverpool, England	F. W. Walker, Vancouver.
The Royal Scottish Insurance Co., Ltd., Glasgow, Scotland	J. H. Watson, Vancouver.
St. Paul Fire & Marine Insurance Company, St. Paul, Minn.	B. S. Heisterman, Victoria.
Scottish Metropolitan Assurance Co., Ltd., Edinburgh, Scotland	Lawrence W. Peel, Vancouver.
Scottish Union & National Insurance Company, Edinburgh, Scotland	Pemberton & Son, Victoria.
Springfield Fire & Marine Insurance Company, Springfield, Mass.	Chas. H. Macaulay, Vancouver.
The Sterling Fire Insurance Company of Indiana, U.S.A.	H. R. Budd, Vancouver.
Stuyvesant Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Sun Insurance Office, London, England	F. B. Pemberton, Victoria.
The Traders & General Insurance Association, Ltd., London, Eng.	C. D. J. Christie, Vancouver.
Union Assurance Society, Limited, London, England	D. C. McGregor, Vancouver.
The Union Fire Insurance Company, Paris, France	Franco-Canadian Company, Limited, Vancouver.
‖Union Fire and Casualty Company	Gordon Bell, Vancouver.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Union Marine Insurance Company, Limited, Liverpool, England	C. H. Maculay, Vancouver.
United States Fire Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Vulcan Fire Insurance Company of Oakland, Cal.	T. W. Greer, Vancouver.
¶The Wawanesa Mutual Insurance Co., Wawanesa, Man.	W. W. Kempton, Lumby.
Western Assurance Company, Toronto, Ont.	R. W. Douglas, Vancouver.
Westchester Fire Insurance Company, New York, N.Y.	R. P. Clark, Victoria.
The Yang-tsze Insurance Association, Limited, Shanghai, China	B. G. D. Phillips, Vancouver.
Yorkshire Insurance Company, Limited, York, England	H. W. Dyson, Vancouver.

‡ Licence under "B.C. Fire Insurance Act" limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, burglary, plate glass, and automobile insurance.

† Licence under "B.C. Fire Insurance Act," limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, accident, sickness, automobile, and plate-glass insurance.

§ Licence under "B.C. Fire Insurance Act," limited to insuring automobiles against loss or damage by fire; also licensed under the "Insurance Act" to transact automobile, burglary, accident, sickness, and plate-glass insurance.

‖ Deposit: Dominion War Loan bonds, $13,600; Toronto Harbour Commission bonds, $20,000. (Includes deposit under "Insurance Act.")

¶ Deposit: Dominion War Loan bonds, $25,000.

NOTE.—Licensed since December 31st, 1920:—

* Merchants Casualty Company, Winnipeg, Man.; J. B. Love, Vancouver.
The Merchants Marine Insurance Company, Ltd., London, England; Jas. A. Young, Vancouver.
Reliance Insurance Company of Canada, Montreal, Quebec; Chas. V. Wakely, Vancouver.
Scottish Canadian Assurance Corporation, Toronto, Ont.; Alfred W. McLeod, Vancouver.

* Licensed under "British Columbia Fire Insurance Act" limited to insurance of automobiles against fire. Also licensed under "Insurance Act" to transact accident (excluding employers' liability) and sickness insurance.

Name of Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to June 30th, 1921.)	Description of Insurance Business for which Licensed. (Corrected to June 30th, 1921.)
Ætna Insurance Co., Hartford, Conn.	J. E. Kinsman, Victoria	*Automobile, marine, tornado, and inland transportation.
Ætna Life Insurance Co., Hartford, Conn.	John F. Brandt, Vancouver	Life.
Alliance Assurance Co., Ltd., London, Eng.	W. Anderson and H. Miskin, Vancouver	*Marine, accident, sickness, guarantee, automobile, burglary, plate glass, and hail.
Alliance Insurance Co. of Philadelphia, Pa.	C. N. Corwin, Vancouver	*Marine, automobile (excluding insurance against loss by reason of injury to the person), and inland transportation.
American Alliance Insurance Co., New York, N.Y.	O. D. Lampman, Vancouver	*Automobile (excluding insurance against loss by reason of injury to the person).
American Central Insurance Company, St. Louis, Mo.	D. W. Campbell, Victoria	*Automobile, explosion (including riot and civil commotion) and tornado.
The Boiler Inspection & Insurance Co. of Canada, Toronto, Ont.	R. V. Winch & Co., Ltd., Vancouver	Steam-boiler.
Boston Insurance Co., Boston, Mass.	E. C. Jahour, Vancouver	*Marine.
The British and Foreign Marine Insurance Co., Ltd., Liverpool, Eng.	B. C. Mess, Victoria	Marine, inland transportation, and sprinkler leakage.
British America Assurance Co., Toronto, Ont.	P. R. Brown, Victoria	*Hail, occan, marine, inland marine, inland transportation, and automobile.
(1.) The British Columbia Plate Glass Insurance Co., Vancouver, B.C.	Head Office, Vancouver	Plate glass.
British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
British Traders Insurance Co., Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver	*Automobile and marine.
The Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver	*Accident, sickness, plate glass, guarantee, burglary, and automobile.
Canada Life Assurance Co., Toronto, Ont.	F. W. Marsh, Vancouver	Life.
Canada Security Assurance Company, Toronto, Ont.	J. J. Banfield, Vancouver	*Automobile.
Canadian Fire Insurance Company, Winnipeg, Man.	F. C. Paterson, Victoria	*Automobile.
The Canadian Surety Co., Toronto, Ont.	William Savage, Vancouver	Guarantee, burglary, plate glass, and automobile. (Also licensed under "B.C. Fire Insurance Act" to insure automobiles against loss or damage by fire.)
The Canton Insurance Office, Limited, Victoria, Hong Kong	Wm. Monteith & Co., Ltd., Victoria	Marine.
The Capital Life Assurance Co. of Canada, Ottawa, Ont.	W. D. Kennedy, Vancouver	Life.
Car and General Insurance Corporation, Ltd., London, Eng.	J. H. Lawson, Vancouver	*Accident, hail, automobile, and sickness.
Columbia Insurance Company, Jersey City, N.J.	F. W. Rounsefell, Vancouver	*Automobile (excluding insurance against loss by reason of bodily injury to the person) and inland transportation.
Confederation Life Association, Toronto, Ont.	H. R. Glass, Vancouver	Life.
Continental Casualty Co., Hammond, Ind.	A. S. Matthew, Vancouver	Accident, sickness, and automobile.
Continental Insurance Company, New York, N.Y.	W. A. Lawson, Vancouver	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
The Continental Life Insurance Co., Toronto, Ont.	N. B. Bailey, Vancouver	Life.
The Crown Life Insurance Co., Toronto, Ont.	F. R. McD. Russell, Vancouver	Life.
Dominion Gresham Guarantee & Casualty Co., Montreal, Que.	B. S. Brown, Vancouver	Accident, sickness, guarantee, burglary, and automobile.
The Dominion Life Assurance Co., Waterloo, Ont.	N. T. Truell, Vancouver	Life.
The Dominion of Canada Guarantee & Accident Ins. Co., Toronto, Ont.	J. C. Stuart, Vancouver	*Accident, guarantee, sickness, burglary, and plate glass.
The Eagle Star & British Dominions Insurance Co., Ltd., London, Eng.	R. J. Loewen and R. G. Harvey, Vancouver	*Marine and automobile (limited to insurance against loss or damage from accident or injury suffered by an employee or other person caused by an automobile for which the owner is liable).
Employers Liability Assurance Corporation, Ltd., London, Eng.	Jas. A. Young, Vancouver	*Accident, sickness, guarantee, automobile, burglary, steam-boiler, and plate glass.
Equitable Fire & Marine Insurance Co., Providence, R.I.	A. M. Pound, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
The Excelsior Life Insurance Co., Toronto, Ont.	F. J. Gillespie, Vancouver	Life.
The Fidelity & Casualty Co., New York, N.Y.	Sceley & Co., Vancouver	Accident, sickness, burglary, steam-boiler, and plate glass.
Fidelity Phenix Fire Insurance Co., New York, N.Y.	Arthur Coles, Victoria	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
Fireman's Fund Insurance Co., San Francisco, Cal.	E. D. Todd, Victoria	*Marine, inland transportation, and insurance against loss or damage to automobiles by accident, burglary, or theft.
Firemen's Insurance Co. of Newark, N.J.	C. B. Whitney, Vancouver	*Marine.
General Accident Assurance Co. of Canada, Toronto, Ont.	W. F. Sangster, Vancouver	*Accident, sickness, steam-boiler, guarantee, and automobile.
General Accident Fire & Life Assurance Corpn., Ltd., Perth, Scotland	E. J. Enthoven, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
General Animals Insurance Co. of Canada, Montreal, Que.	R. W. Douglas, Vancouver	Live stock.
Glens Falls Insurance Co., Glens Falls, N.Y.	J. C. Thorn, Vancouver	*Hail, tornado, automobile, explosion (including riot and civil commotion) and inland transportation.
Globe & Rutgers Fire Insurance Co., New York, N.Y.	A. McC. Creery, Vancouver	*Inland transportation. Automobile (excluding insurance against loss by reason of bodily injury to the person), explosion (except upon steam-boilers, pipes, fly-wheels, engines, and machinery connected therewith or operated thereby), and marine.
Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver	*Accident, sickness, burglary, automobile, guarantee, and forgery.
Great American Insurance Co., New York, N.Y.	S. Burke, Vancouver	*Hail, tornado, sprinkler leakage, marine, automobile (excluding insurance against loss by reason of bodily injury), explosion (including riot and civil commotion), and inland transportation.
(2) Great North Insurance Company, Calgary, Alta.	J. Edward Bird, Vancouver	Live stock.
The Great West Life Assurance Co., Winnipeg, Man.	J. A. Johnson, Vancouver	Life.
The Guarantee Company of North America, Montreal, Que.	C. A. Holland, Victoria	Guarantee.
Guardian Insurance Co. of Canada, Montreal, Que.	W. E. Graveley, Vancouver	*Accident, sickness, guarantee, plate glass, burglary, and automobile.
Hartford Accident and Indemnity Company, Hartford, Conn.	R. H. Budd, Vancouver	Accident, automobile, burglary, guarantee, live stock, plate glass, and sickness.
Hartford Fire Insurance Co., Hartford, Conn.	G. A. Kirk, Victoria	*Hail, explosion (including riot and civil commotion), inland transportation, cyclone or tornado, sprinkler leakage, and insurance against loss or damage to automobiles by accident, burglary, or theft.
Home Insurance Co., New York, N.Y.	H. W. Dyson, Vancouver	*Automobile, sprinkler leakage, hail, tornado, and explosion (including riot and civil commotion).
Imperial Guarantee & Accident Insurance Co. of Canada, Toronto, Ont.	D. Cramer, Vancouver	Guarantee, accident, sickness, automobile, and plate glass. (Also licensed under "B.C. Fire Insurance Act" to transact the business of insurance of automobiles against fire.)
Imperial Life Assurance Co. of Canada, Toronto, Ont.	Stanley Henderson, Vancouver	Life.
Insurance Company of North America, Philadelphia, Pa.	C. N. Corwin, Vancouver	*Inland transportation, automobile (excluding injury to the person), marine, and explosion (including riot and civil commotion).
Law, Union & Rock Insurance Co., Ltd., London, Eng.	Wm. Thompson, Vancouver	*Accident, sickness, burglary, plate glass, and automobile.
Liverpool-Manitoba Assurance Company, Montreal, Que.	L. U. Conyers, Victoria	*Explosion (including riot and civil commotion).
Lloyds Plate Glass Insurance Co., New York, N.Y.	C. A. MacMorran, Vancouver	Plate glass.
The London & Lancashire Guarantee & Accident Co. of Canada, Toronto, Ont.	Wm. Thompson, Vancouver	Accident, sickness, guarantee, plate glass, automobile, burglary, and insurance against loss or damage occasioned by larceny, theft, or stealing from the person by violence, threat, hold-up or otherwise.
London & Provincial Marine & General Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine.
London & Scottish Assurance Corporation, Limited, London, Eng.	Lawrence W. Peel, Vancouver	Life.
London Assurance Corporation, London, Eng.	R. V. Winch & Co., Ltd., Victoria	*Marine, automobile, inland marine, and inland transportation.
London Guarantee & Accident Co., Ltd., London, Eng.	J. H. Watson, Vancouver	*Accident, sickness, guarantee, and burglary.
London Mutual Fire Insurance Company, Toronto, Ont.	C. G. Hobson, Vancouver	*Automobile.
The London Life Insurance Co., London, Ont.	William B. Ryan, Victoria	Life.
Loyal Protective Insurance Co., Boston, Mass.	G. H. Grant, Vancouver	Accident and sickness amongst members of I.O.O.F.
Lumbermen's Mutual Casualty Company, Chicago, Ill.	J. H. Constantine, Vancouver	Automobile.
The Manufacturers Life Insurance Co., Toronto, Ont.	W. B. Barwis, Vancouver	Life.
The Marine Insurance Co., Ltd., London, Eng.	W. W. Johnston, Vancouver	*Inland transportation, automobile, marine, and inland marine.
Maritime Insurance Co., Ltd., London, Eng.	R. P. Rithet & Co., Ltd., Victoria	Marine.
Maryland Casualty Co., Baltimore, Maryland	H. T. Barnes, Victoria	Accident, burglary, guarantee, plate glass, steam-boiler, and sickness.
Merchants Casualty Co., Winnipeg, Man.	J. B. Love, Vancouver	Accident (excluding employers' liability), sickness, and automobile.
Metropolitan Life Insurance Co., New York, N.Y.	P. Winterborne, Victoria	Life.
The Monarch Life Assurance Co., Winnipeg, Man.	R. W. Harris, Vancouver	Life.
The Motor Union Insurance Company, Limited, London, Eng.	W. W. Johnston, Vancouver	*Accident, automobile, and marine.
Mutual Life Assurance Co. of Canada, Waterloo, Ont.	W. J. Twiss, Vancouver	Life.
The Mutual Life Insurance Co. of New York, N.Y.	A. Callander, Vancouver	Life.
National Benefit Assurance Company, Ltd., London, Eng.	J. T. Summerfield, Vancouver	*Marine, accident, sickness, hail, and automobile.
National Fire Insurance Co. of Hartford, Hartford, Conn.	H. T. Barnes, Victoria	Tornado, explosion (including riot and civil commotion), inland transportation and marine insurance, and insurance of automobiles against loss or damage resulting from the hazards of navigation and transportation, and from collision with any stationary or moving object.
National Life Assurance Co. of Canada, Toronto, Ont.	Lindley Crease, Victoria	Life.
National Provincial Plate Glass & General Insurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	Plate glass.
National Surety Co., New York, N.Y.	R. V. Winch, Vancouver	Guarantee, burglary, and forgery.
Newark Fire Insurance Co., Newark, N.J.	F. W. Walker, Vancouver	*Marine and automobile (excluding insurance against loss by reason of injury to the person).
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver	*Automobile (excluding insurance against loss by reason of injury to the person) and marine.
New York Life Insurance Co., New York, N.Y.	R. A. Durham, Vancouver	Life.
New York Plate Glass Insurance Co., New York, N.Y.	A. S. Matthew, Vancouver	Plate glass.
New Zealand Insurance Company, Ltd., Auckland, New Zealand	Dale & Company, Limited, Vancouver	Marine.
Niagara Fire Insurance Co., New York, N.Y.	D. Leeming, Victoria	*Tornado, automobile (including damage to automobiles in transit by rail), marine, and explosion (including riot and civil commotion).
The North American Accident Insurance Co., Montreal	J. E. Sears, Vancouver	*Accident, sickness, plate glass, automobile, and burglary.
North American Life Assurance Co., Toronto, Ont.	Ellis W. Keenleyside, Vancouver	Life.
Northern Assurance Company, Ltd., London, Eng.	R. V. Winch & Co., Ltd., Vancouver	*Marine, accident, sickness, automobile, guarantee, and plate glass.
Northern Life Assurance Co. of Canada, London, Ont.	W. H. Clarke, Vancouver	Life.
Northwestern Mutual Fire Association, Seattle, Wash.	N. B. Whitley, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
Northwestern National Insurance Co., Milwaukee, Wis.	W. B. Blane, Vancouver	*Automobile.
Norwich Union Fire Insurance Society, Ltd., Norwich, Eng.	B. S. Heisterman, Victoria	*Accident, sickness, plate glass, automobile.
Norwich Union Life Insurance Society, Norwich, Eng.	B. S. Heisterman, Victoria	Life.
The Ocean Accident & Guarantee Corporation, Ltd., London, Eng.	J. R. Hannah, Vancouver	*Accident, sickness, guarantee, plate glass, automobile, and burglary.
Ocean Marine Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine.
Occidental Fire Insurance Company, Winnipeg, Man.	A. E. Short, Vancouver	*Automobile.
Pacific Marine Insurance Company, Vancouver, B.C.	L. H. Wright, Vancouver	*Automobile and inland transportation.
The Palatine Insurance Company, Limited, London, Eng.	A. W. Ross, Vancouver	*Automobile.
Phoenix Assurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	*Life.
Phoenix Insurance Co., Hartford, Conn.	A. E. Haynes, Victoria	*Marine and automobile (excluding insurance against loss by reason of injury to the person).
Preferred Accident Insurance Company of New York, N.Y.	J. S. Gall, Vancouver	Accident, sickness, and automobile.
Protective Association of Canada, Granby, Que.	E. G. Bell, Vancouver	Accident and sickness restricted to members of the Masonic Order.
The Prudential Insurance Co. of America, Newark, N.J.	B. F. Ogilvie, Vancouver	Life.
Queen Insurance Co. of America, New York, N.Y.	Rithet Consolidated, Limited, Victoria	*Automobile and inland transportation.
Queensland Insurance Co., Ltd., Sydney, Australia	C. Gardiner Johnson, Vancouver	Marine.
Railway Passengers Assurance Co., London, Eng.	P. H. Grant, Vancouver	Accident, sickness, guarantee, plate glass, and automobile.
The Ridgely Protective Association, Worcester, Mass.	John Dunlop, Nelson	Accident and sickness amongst members of I.O.O.F.
Reliance Marine Insurance Co., Liverpool, Eng.	Rithet Consolidated, Limited, Victoria	Marine.
Royal Exchange Assurance, London, Eng.	H. G. Lawson, Jr., Victoria	*Accident, sickness, and automobile.
Royal Insurance Co., Ltd., Liverpool, Eng.	F. W. Walker, Vancouver	*Life and marine.
(3) Royal Plate Glass Insurance Company of Canada, Vancouver, B.C.	Head Office, Vancouver	Plate glass.
St. Paul Fire & Marine Insurance Co., St. Paul, Minn.	B. S. Heisterman, Victoria	*Automobile, inland transportation, and marine.
Scottish Metropolitan Assurance Corporation, Limited, Edinburgh, Scotland	Lawrence W. Peel, Vancouver	*Accident, sickness, guarantee, automobile, marine, and inland marine.
Scottish Union & National Insurance Co., Edinburgh, Scotland	E. B. Pemberton, Victoria	Tornado, sprinkler leakage, and automobile.
The Sovereign Life Assurance Co., Winnipeg, Man.	V. L. Stokoe, Vancouver	Life.
The Standard Life Assurance Co., Edinburgh, Scotland	J. W. Kerr, Vancouver	Life.
Standard Marine Insurance Co., Ltd., Liverpool, Eng.	C. Gardiner Johnson, Vancouver	Marine.
The Sterling Fire Insurance Company of Indiana, Indianapolis, Ind.	R. H. Budd, Vancouver	*Tornado and automobile.
Sun Life Assurance Co. of Canada, Montreal, Que.	H. O. Leach, Vancouver	Life.
Tokio Marine & Fire Insurance Co., Tokio, Japan	B. G. D. Phillips, Vancouver	Marine
Travelers Indemnity Company, Hartford, Conn.	R. C. Hall, Victoria	Accident, sickness, steam-boiler, plate glass, burglary, automobile, and fly-wheel.
The Travelers Insurance Co., Hartford, Conn.	R. C. Hall, Victoria	Life and accident.
Travellers Life Assurance Co. of Canada, Montreal, Que.	J. D. Mather, Vancouver	Life.
(5.) Union Fire and Casualty Company	Gordon Bell, Vancouver	*Health, accident, and automobile.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver	*Marine and automobile.
Union Marine Insurance Company, Ltd., Liverpool, Eng.	C. H. Macaulay, Vancouver	Marine, inland marine, inland transportation, and automobile (excluding insurance against loss by reason of bodily injury to the person).
Union Mutual Life Insurance Co., Portland, Maine	Viggo F. Laursen, Vancouver	Life.
United States Fidelity & Guaranty Co., Baltimore, Md.	Leslie H. Wright, Vancouver	Guarantee, accident, sickness, burglary, plate glass, steam-boiler, and robbery.
United States Fire Insurance Co., New York, N.Y.	H. A. Robertson, Vancouver	* Automobile (excluding insurance against loss by reason of injury to the person and explosion (including riot and civil commotion).
United States Lloyds, Inc., New York, N.Y.	B. G. D. Phillips, Vancouver	Marine.
Western Assurance Company, Toronto, Ont.	R. W. Douglas, Vancouver	*Marine, inland transportation, explosion (including riot and civil commotion), tornado, and automobile.
Western Casualty Company, Denver, Col.	W. H. Biegel, Vancouver	Accident and sickness.
(4) Western Empire Life Assurance Co., Winnipeg, Man.	C. Wilson, Vancouver	Life.
Western Life Assurance Co., Winnipeg, Man.	C. E. Mahon, Vancouver	Life.
Westchester Fire Insurance Company, New York, N.Y.	R. P. Clark, Victoria	*Explosion (including riot and civil commotion).
The World Marine & General Insurance Co., Ltd., London, Eng.	B. C. Mess, Victoria	Marine.
The Yang-tsze Insurance Association, Ltd., Shanghai, China	B. G. D. Phillips, Vancouver	Marine.
Yorkshire Insurance Co., Ltd., York, Eng.	H. W. Dyson, Vancouver	*Accident, sickness, plate glass, and live stock.

* Also licensed under "B.C. Fire Insurance Act" to transact fire insurance.

Securities (par value) deposited under the Act:—

(1.) War Loan Bonds, $1,000; Municipal Securities, $5,000; B.C. Inscribed Stock, $973.32.
(2.) Cash, $5,000.
(3.) Dominion War Loan Bonds, $5,000, and deposit receipt, Canadian Bank of Commerce, $125.
(4.) Dominion War Loan Bonds, $27,000.
(5.) Dominion War Loan Bonds, $15,600; Toronto Harbour Commission Bonds, $20,000. (Includes deposit under "B.C. Fire Insurance Act.")

NOTE.—Licensed since December 31st, 1920:—

The London & Lancashire Insurance Co., Ltd., Liverpool, England; Wm. Thompson, Vancouver; marine, automobile, and explosion (including riot and civil commotion).
The Merchants Marine Insurance Co., Ltd., London, England; James A. Young, Vancouver; automobile.
Union Assurance Society, Limited, London, England; Chas. R. Bishop, Victoria; automobile.

TABLE I.—NET FIRE INSURANCE PREMIUMS AND NET LOSSES, 1920.

Name of Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
Acadia Fire Insurance Co	$ 33,871 18	$ 6,675 04	$ 4,330 04
Aetna Fire Insurance Co	73,204 67	10,812 37	11,230 09
Agricultural Insurance Co	31,558 49	5,550 05	3,562 85
Alliance Assurance Co., Ltd	32,229 01	409 60	343 40
Alliance Insurance Co. of Philadelphia	46,587 09	22,345 04	26,788 04
American Alliance Insurance Co	7,245 19	1,872 66	1,557 66
American Central Insurance Co	32,523 23	7,196 33	4,784 94
American Equitable Assurance Co	6,573 56	1,173 92	1,173 92
Atlas Assurance Co., Ltd	36,324 83	2,838 54	2,805 26
Beaver Fire Insurance Co	7,554 96	*Nil.*	392 67
Boston Insurance Co	47,707 13	25,886 42	30,783 16
British America Assurance Co	65,778 04	17,929 92	18,142 42
British Colonial Fire Insurance Co	26,609 21	8,612 65	8,612 65
British Crown Assurance Corporation, Ltd	114,838 51	53,548 30	57,933 42
British General Insurance Co., Ltd	13,484 83	9,063 50	7,730 50
British Northwestern Fire Insurance Co	24,041 53	2,504 35	1,911 32
British Traders Insurance Co., Ltd	50,932 64	16,667 46	15,332 46
Caledonian American Insurance Co	6,418 70	7 66	7 66
Caledonian Insurance Co	52,979 89	2,762 33	3,176 97
California Insurance Co	31,198 47	7,136 41	7,465 41
Canada Accident & Fire Assurance Co	32,040 15	21,199 46	21,004 36
Canada National Fire Insurance Co	39,674 99	3,443 26	3,443 26
Canada Security Assurance Co	9,918 01	1,295 04	1,283 04
Canadian Indemnity Co	9,007 42	2,759 42	1,968 35
Canadian Fire Insurance Co	36,351 96	5,288 84	4,920 31
Canadian Surety Co	704 47	5 85	5 85
Car & General Insurance Corporation, Ltd	9,294 81	1,854 10	1,849 19
Century Insurance Co., Ltd	38,577 15	15,204 91	9,414 75
China Fire Insurance Co., Ltd	8,979 82	2,054 29	554 29
Citizens Insurance Co. of Missouri	42,181 69	9,580 51	9,580 51
Columbia Insurance Co	11,366 40	2,082 31	33 81
Commercial Union Assurance Co., Ltd	106,685 05	36,080 52	36,725 13
Commercial Union Fire Insurance Co. of N.Y	7,907 02	1,760 76	1,711 09
Connecticut Fire Insurance Co	40,573 36	8,291 61	10,712 64
Continental Insurance Co	55,407 66	10,511 47	17,119 09
Dominion Fire Insurance Co	21,679 37	2,205 85	2,180 85
Dominion of Canada Guarantee & Accident Insurance Co	3,712 89	*Nil.*	436 75
Eagle Star & British Dominions Insurance Co., Ltd	51,060 44	16,194 54	15,688 36
Employers Liability Assurance Corporation, Ltd	60,703 12	20,194 42	19,616 12
Equitable Fire & Marine Insurance Co	9,064 52	744 50	689 50
Essex & Suffolk Equitable Insurance Society, Ltd	5,667 01	666 04	665 04
Fidelity Phenix Fire Insurance Co	73,730 28	12,969 69	14,521 40
Fire Association of Philadelphia	24,756 77	5,624 69	7,441 84
Fire Insurance Co. of Canada	17,179 90	646 65	610 96
Fireman's Fund Insurance Co	58,703 66	87,699 08	141,416 03
Firemen's Insurance Co. of Newark	8,245 01	15,003 23	1,034 08
General Accident Assurance Co. of Canada	12,702 35	2,301 56	2,301 56
General Accident Fire & Life Assurance Corporation, Ltd	25,367 83	1,814 27	2,017 92
General Fire Assurance Co	14,920 74	8,229 07	7,678 07
Girard Fire & Marine Insurance Co	5,139 89	314 13	2,979 13
Glens Falls Insurance Co	16,206 82	5,156 22	4,963 22
Globe & Rutgers Fire Insurance Co	56,178 00	19,249 08	17,522 21
Globe Indemnity Co. of Canada	28,196 25	2,548 01	2,849 01
Great American Insurance Co	68,875 32	15,432 41	16,248 41
Guardian Assurance Co., Ltd	112,967 99	26,629 27	27,119 27
Guardian Insurance Co. of Canada	15,962 05	5,434 07	3,434 07
Hartford Fire Insurance Co	140,409 20	49,064 95	53,954 03
Home Insurance Co	121,663 26	4,834 06	25,221 87
Hudson Bay Insurance Co	41,503 86	17,450 24	14,885 24
Imperial Guarantee & Accident Insurance Co. of Canada	3,283 43	2,836 79	2,966 06
Imperial Underwriters Corporation of Canada	49,605 51	16,375 81	13,345 24
Insurance Co. of North America	129,028 94	69,441 94	70,890 94
Insurance Co. of the State of Pennsylvania	54,232 35	10,778 73	10,430 75
Law, Union & Rock Insurance Co., Ltd	24,815 49	3,108 22	3,108 22
Liverpool & London & Globe Insurance Co., Ltd	189,410 95	46,407 89	40,945 60
Liverpool-Manitoba Assurance Co	58,647 32	33,019 83	16,194 83
London & Lancashire Insurance Co., Ltd	105,577 48	37,818 79	37,628 40
London & Lancashire Guarantee & Accident Co. of Canada	8,963 98	1,016 00	1,016 00
London Assurance Corporation	101,690 61	31,047 50	38,244 59
London Guarantee & Accident Co., Ltd	49,261 90	31,905 79	23,122 52
London Mutual Fire Insurance Co. of Canada	60,924 04	12,336 69	16,830 96
Marine Insurance Co., Ltd	6,527 95	2,094 34	2,147 94
Mechanics & Traders Insurance Co	29,402 18	6,031 71	3,576 36
Mercantile Fire Insurance Co	30,741 21	7,407 65	7,411 15
Merchants Fire Assurance Corporation of N.Y	32,783 26	8,792 38	7,472 18
Millers National Insurance Co	5,130 27	2,704 03	2,736 37
Motor Union Insurance Co., Ltd	*Nil.*	*Nil.*	*Nil.*
Mount Royal Assurance Co	61,395 89	31,289 45	33,074 45
National Ben Franklin Fire Insurance Co	20,477 78	5,875 09	7,339 50
National Benefit Assurance Co., Ltd	788 96	62 17	62 17
National Fire Insurance Co. of Hartford	81,711 56	23,238 50	22,649 00
Nationale Fire Insurance Co., Paris	42,412 93	7,396 95	7,978 50
National Union Fire Insurance Co	23,399 13	3,076 24	6,365 29
Newark Fire Insurance Co	14,620 11	7,159 72	7,163 72
Carried forward	$3,369,577 88	$1,046,032 64	$1,096,566 19

TABLE I.—NET FIRE INSURANCE, ETC.—*Continued.*

Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
Brought forward	$3,369,577 88	$1,046,032 64	$1,096,566 19
New Hampshire Fire Insurance Co.	13,329 84	6,088 38	14,366 96
New Jersey Insurance Co.	46,736 81	12,397 32	10,661 84
Niagara Fire Insurance Co.	48,611 93	12,674 40	14,287 40
North American Accident Insurance Co.	383 87	133 10	114 10
Northern Assurance Co., Ltd.	108,464 42	40,180 27	39,969 34
North British & Mercantile Insurance Co., Ltd.	82,153 32	32,068 75	25,815 83
North Empire Fire Insurance Co.	38,895 75	8,749 27	8,199 27
North West Fire Insurance Co.	13,983 68	1,133 87	1,133 87
Northwestern Mutual Fire Association	61,575 64	34,820 54	15,820 54
Northwestern National Insurance Co	49,345 16	13,644 92	13,218 42
Norwich Union Fire Insurance Society, Ltd.	98,664 79	27,469 41	32,281 77
Ocean Accident & Guarantee Corporation, Ltd.	13,368 68	1,354 95	1,354 95
Occidental Fire Insurance Co.	9,071 54	5,900 31	6,067 21
Pacific Coast Fire Insurance Co.	47,294 72	10,699 72	9,136 00
Pacific Marine Insurance Co.	9,017 97	1,267 71	1,105 78
Palatine Insurance Co., Ltd.	43,586 42	12,407 22	13,503 74
Phenix Fire Insurance Co. of Paris	18,945 46	9,979 72	8,753 72
Phoenix Assurance Co., Ltd.	256,908 53	89,105 75	64,567 66
Phoenix Insurance Co. of Hartford	51,211 85	11,877 14	13,957 14
Providence Washington Insurance Co.	29,171 38	12,445 87	9,433 93
Provincial Insurance Co., Ltd.	11,436 09	4,606 80	4,606 80
Quebec Fire Assurance Co.	23,774 99	3,770 51	3,770 51
Queen Insurance Co. of America	92,044 44	29,553 83	24,254 83
Queensland Insurance Co., Ltd.	21,049 10	5,087 05	4,770 24
Royal Exchange Assurance	43,217 14	7,408 56	8,229 84
Royal Insurance Co., Ltd.	141,143 01	34,609 34	33,555 34
Royal Scottish Insurance Co., Ltd.	18,117 22	5,799 12	4,905 12
St. Paul Fire & Marine Insurance Co.	35,195 98	6,403 36	4,731 59
Scottish Metropolitan Assurance Co., Ltd.	40,469 68	7,311 82	7,306 82
Scottish Union & National Insurance Co.	57,119 68	10,521 49	10,490 49
Springfield Fire & Marine Insurance Co.	64,400 81	16,976 19	20,756 31
Sterling Fire Insurance Co. of Indiana.	*Nil.*	*Nil.*	*Nil.*
Stuyvesant Insurance Co.	26,834 15	6,796 87	7,976 60
Sun Insurance Office	74,869 17	12,735 21	13,530 53
Traders & General Insurance Association, Ltd.	3,550 44	*Nil.*	*Nil.*
Union Assurance Society, Ltd.	61,478 47	11,545 76	12,872 45
Union Fire Insurance Co. of Paris	29,349 58	9,701 22	9,618 06
Union Fire & Casualty Co.	30 93	*Nil.*	*Nil.*
Union Insurance Society of Canton, Ltd.	55,796 56	10,607 18	10,247 68
Union Marine Insurance Co., Ltd.	9,336 94	5,494 23	5,494 23
United States Fire Insurance Co.	34,164 14	3,948 18	2,339 36
Vulcan Fire Insurance Co.	20,411 51	7,841 80	5,476 80
Wawanesa Mutual Insurance Co.	1,407 31	*Nil.*	*Nil.*
Western Assurance Co.	64,670 36	19,397 79	18,648 54
Westchester Fire Insurance Co	37,857 69	9,946 35	19,302 60
Yang-tsze Insurance Association, Ltd.	15,043 07	443 81	443 81
Yorkshire Insurance Co., Ltd.	34,730 25	15,210 60	14,523 26
Total	$5,427,798 35	$1,636,148 83	$1,648,167 47

TABLE II.—FIRE INSURANCE SUMMARY.

Year.	Net Premiums.	Net Amount of Losses incurred.	Net amount of Losses paid.
1916	$ 3,121,885 87	$1,378,764 79	$1,290,641 50
1917	3,609,442 65	887,639 01	958,460 60
1918	4,085,219 68	1,214,162 65	1,120,475 80
1919	4,370,432 98	1,259,983 28	1,181,196 47
1920	5,427,798 35	1,636,148 83	1,648,167 47
Totals	$20,614,779 53	$6,376,698 56	$6,198,941 84

TABLE III.—DISPOSITION OF PREMIUMS RECEIVED.

	1918.	1919.	1920.
Rate of losses paid per cent. of premiums received	53.84	41.67	43.40
Rate of dividend or bonus to stockholders per cent. of premiums received (Canadian companies only)	2.79	4.74	....
Rate of general expenses per cent. of premiums received	35.61	36.56	....
Rate of premiums charged per cent. of risks taken	1.07	1.06	1.05

NOTE.—The figures are taken from the reports of the Superintendent of Insurance for the Dominion for 1919–20–21, and cover the business throughout Canada of the companies to which they refer.

TABLE IV.—RATIO OF LOSSES INCURRED TO PREMIUMS WRITTEN IN THE VARIOUS PROVINCES.

Provinces.	1920.	1919.	1918.	1917.
Alberta	34.51	34.60	44.64	32.87
British Columbia	30.27	29.84	29.79	25.40
Manitoba	40.99	25.25	62.38	59.15
New Brunswick	66.24	52.48	42.89	59.54
Nova Scotia	66.69	50.32	28.40	69.29
Ontario	38.48	40.89	59.47	62.77
Prince Edward Island	35.33	46.87	20.55	48.52
Quebec	56.97	50.54	52.69	60.98
Saskatchewan	41.09	39.23	48.74	44.44
Yukon	....	....	5.86	5.26
Totals	45.61	41.10	50.76	55.62

NOTE.—The figures are abstracted from the report for 1921 of the Superintendent of Insurance for the Dominion.

TABLE V.—FIRES REPORTED.

Districts reporting.	Number.	Amount of Loss.
City Municipalities (35).		
Alberni	...	.....
Armstrong	4	$ 6,806
Chilliwack	11	55,158
Courtenay	1	2,615
Cranbrook	5	535
Cumberland	...	.....
Duncan	6	29,920
Enderby	...	.....
Fernie	6	9,107
Grand Forks	4	14,416
Greenwood	1	200
Kamloops	6	758
Kaslo	1	666
Kelowna	11	21,340
Ladysmith	2	15,173
Merritt	4	6,604
Nanaimo	19	3,893
Nelson	13	23,238
New Westminster	40	68,202
North Vancouver	22	11,710
Phoenix	...	.....
Port Alberni	6	13,592
Port Coquitlam	18	112,365
Port Moody	6	127,710
Prince George	3	567
Prince Rupert	2	1,227
Revelstoke	15	19,093
Rossland	8	51,587
Salmon Arm	1	10
Sandon	...	.....
Slocan	5	10,510
Trail	5	7,268
Vancouver	404	406,627
Vernon	9	10,734
Victoria	149	51,901
Totals	787	$1,083,532
District Municipalities (28.)		
Burnaby	27	73,947
Chilliwack	2	56,384
Coldstream	...	.....
Coquitlam	3	2,175
Delta	4	190,650
Esquimalt	6	438
Fraser Mills	2	327
Kent	...	.....
Langley	3	1,169
Maple Ridge	8	53,600
Matsqui	2	2,724
Mission	4	5,521
North Cowichan	8	86,168
North Vancouver	9	11,991
Oak Bay	11	4,673
Peachland	...	.....
Penticton	6	266
Pitt Meadows	...	.....

TABLE V.—FIRES REPORTED—*Continued.*

Districts reporting.	Number.	Amount of Loss.
District Municipalities—Continued.		
Point Grey	31	$ 30,085
Richmond	10	25,898
Saanich	11	18,658
Salmon Arm	...	.....
South Vancouver	57	47,301
Spallumcheen	...	.....
Sumas	1	25
Summerland	2	9,050
Surrey	7	22,518
West Vancouver	5	1,583
Totals	219	$ 644,551
Insurance Districts (15.)		
Boundary	10	48,825
Fort George	7	17,100
Hazelton	17	65,514
Kamloops	5	7,730
Kootenay, North-east	5	11,265
Kootenay, South-east	17	15,241
Kootenay, West	29	101,272
Lillooet	4	5,016
Nanaimo, West Coast	23	67,418
Peace River	1	1,600
Prince Rupert	15	273,966
Vancouver-New Westminster	18	183,969
Vernon	10	55,854
Victoria	12	44,144
Yale	3	8,535
Totals	176	$ 907,449
Grand totals	1,182	$2,635,532

NOTE.—Construction of buildings—

Fire-resisting	4,	loss $	1,422
Brick	109,	,,	313,924
Frame	1,069,	,,	2,320,186
	1,182,	,,	$2,635,532

Average loss per diem, $7,220.60.

Loss *per capita*—

The Province, estimated population, 550,000	$4 80
City of Vancouver, estimated population, 175,000	2 30
City of Victoria, estimated population, 55,000	90
City of New Westminster, estimated population, 16,500	4 10
City of Fernie, estimated population, 5,000	1 80
City of Nelson, estimated population, 6,000	3 80

TABLE VI.—CAUSES OF FIRES.

Causes of Fires.	Number.	Amount of Loss.
Ashes against wood	19	$ 6,134
Boiler insufficiently protected	3	2,369
Burning incense	1	150
Brushes in hot oven	1	44
Candle carelessness	11	5,002
Carburettor back-firing	11	1,711
Children playing with stove	2	158
Chute casing insufficiently protected	1	40
Clothes too near stove	29	36,406
Coil-oil carelessness	1	26
Curtain from lamp or stove	3	15
Defective boiler	1	225
Defective brooder	1	1,100
Defective chimney	48	29,408
Defective fireplace	23	1,464
Defective forge	1	25
Defective furnace or furnace-pipes	11	15,144
Defective gas installation	1	60
Defective melting-pot	1	50
Defective oil-burner	1	345
Defective oven	1	4,356
Defective stove or stove-pipes	47	86,470
Defective transformer	1	200
Defective wiring	49	38,965
Electrical appliances	28	8,686
Engine back-firing	1	25
Exposure	79	233,601
Fat boiling over, igniting gasolene	1	100
Film igniting	1	25
Fire-crackers	1	55
Fumigation	3	1,228
Furnace or furnace-pipes insufficiently protected	3	7,827
Gas-cylinder exploded	1	513
Gas explosion	1	120
Gasolene carelessness	15	17,584
Grease on stove or range	3	139
Hot bearing	3	97,112
Hot brick in bed	1	10
Hot casting	1	897
Incendiary	26	43,772
Incinerator insufficiently protected	1	2,000
Japanese lantern igniting	2	65
Lamp explosion	23	25,393
Lightning	5	5,854
Live coals	10	175
Match carelessness	22	866
Matches, children with	7	175
Matches, mice with	2	1,500
Mattress against stove	1	8
Oil-stove explosion	5	2,341
Paper too close to stove	1	697
Phosphorus igniting	1	85
Retort insufficiently protected	1	50
Rubbish around furnace or stove	2	420
Smokers' carelessness	112	20,178
Sparks from burner	9	23,635
Sparks from burning rubbish	6	19,464
Sparks from bush fire	19	157,723
Sparks from chimney	229	189,090
Sparks from engine	4	40,509
Sparks from exhaust in automobile	1	1,000
Sparks from fireplace	27	3,322
Sparks from furnace	2	310
Sparks from motor	2	14,796
Sparks from motor igniting oil	1	150
Sparks from stove	13	12,035
Sparks from torch	1	501
Spirit-heater upset	1	300
Spontaneous combustion	7	76,055
Stove explosion	3	5,108
Stove or stove-pipe insufficiently protected	41	23,002
Sun's rays through bowl of water	1	10
Tar boiling over	2	1,560
Thawing pipes	1	2
Torch carelessness	1	100
Unknown	177	1,364,535
Water in sodium	1	50
Wood too close to stove	2	917
Totals	1,182	$2,635,532

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES.

Property.		Causes.		Amount of Loss.	
Aerial tramways	1	Spark from bush fire	1	.....	$ 2,675
Apartments	21	Ashes against wood	1	$ 40	
		Clothes too near stove	1	18	
		Defective chimney	1	180	
		Defective furnace	1	12	
		Defective gas installation	1	60	
		Defective wiring	1	300	
		Live coals	1	3	
		Match carelessness	1	35	
		Smokers' carelessness	7	284	
		Sparks from chimney	2	40	
		Stove explosion	1	8	
		Sun's rays through bowl of water	1	10	
		Unknown	1	94,037	
					95,027
Automobiles	29	Carburettor back-firing	7	$ 1,511	
		Defective wiring	10	4,000	
		Gasolene carelessness	4	9,285	
		Exposure	1	50	
		Smokers' carelessness	1	10	
		Spontaneous combustion	1	65	
		Unknown	5	676	
					15,597
Bakeries	1	Incendiary	1	.....	3,500
Banks	1	Smokers' carelessness	1	.....	15
Barber-shops	2	Stove insufficiently protected	1	$ 3,208	
		Unknown	1	1,150	
					4,358
Barns	15	Defective stove-pipe	1	$ 1,400	
		Incendiary	1	2,500	
		Lightning	1	800	
		Sparks from bush fire	1	450	
		Unknown	11	83,306	
					88,456
Barracks	2	Exposure	1	$ 3,000	
		Unknown	1	20,000	
					23,000
Boarding-houses	3	Clothes too near stove	1	$ 16	
		Sparks from chimney	1	32	
		Unknown	1	3,300	
					3,348
Boiler-houses	1	Sparks from chimney	1	.....	948
Bunkers	3	Sparks from burner	1	$ 25	
		Sparks from engine	1	200	
		Unknown	1	3,000	
					3,225
Bunk-houses	11	Clothes too near stove	1	$ 538	
		Candle carelessness	1	4,503	
		Defective stove or stove-pipe	3	15,270	
		Smokers' carelessness	1	370	
		Sparks from bush fire	2	100,091	
		Sparks from chimney	1	2,385	
		Stove-pipe insufficiently protected	2	3,100	
					126,257
Blacksmith-shops	5	Electrical appliances	1	$ 5,000	
		Exposure	1	4,000	
		Live coals	1	6	
		Unknown	2	6,000	
					15,006
Canneries	4	Sparks from chimney	1	$ 24	
		Unknown	3	385,669	
					385,693
Carpenter-shops	1	Exposure	1	.....	3,000
Cement-works	1	Defective wiring	1	.....	1,000
Chicken-houses	12	Ashes against wood	1	$ 100	
		Defective brooder	1	1,100	
		Incendiary	1	200	
		Lamp explosion	3	2,145	
		Matches, children with	1	5	
		Stove explosion	1	110	
		Unknown	4	1,820	
					5,480
Churches	4	Exposure	1	$ 800	
		Sparks from chimney	1	500	
		Stove-pipe insufficiently protected	1	250	
		Unknown	1	1,464	
					3,014
Clubs	6	Candle carelessness	1	$ 51	
		Oil-stove explosion	1	135	
		Smokers' carelessness	3	246	
		Sparks from chimney	1	750	
					1,182
Cooperages	3	Defective stove	1	$ 5	
		Sparks from burner	1	696	
		Unknown	1	18,800	
					19,501

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Creameries	3	Electrical appliances	1	$ 100	
		Lightning	1	250	
		Matches, mice with	1	1,250	
					$ 1,600
Derricks	1	Unknown	1	.....	25
Dry-kilns	4	Spontaneous combustion	1	$ 37,662	
		Unknown	3	134,100	
					171,762
Dwellings	649	Ashes against wood	10	$ 5,110	
		Brushes in hot oven	1	44	
		Candle carelessness	9	438	
		Children playing with stove	2	158	
		Clothes too near stove	21	4,375	
		Curtains from lamp or stove	3	15	
		Defective chimney	41	17,424	
		Defective fireplace	23	1,464	
		Defective furnace	5	220	
		Defective stove or stove-pipes	34	42,428	
		Defective wiring	17	26,762	
		Electrical appliances	20	3,290	
		Exposure	33	21,132	
		Fire-crackers	1	55	
		Fumigation	3	1,228	
		Furnace or furnace-pipes insufficiently protected	2	7,767	
		Gas explosion	1	120	
		Gasolene explosion	2	1,164	
		Hot brick in bed	1	10	
		Incendiary	9	12,571	
		Japanese lanterns igniting	2	65	
		Lamp explosion	13	10,164	
		Lightning	1	43	
		Live coals	5	121	
		Match carelessness	17	688	
		Matches, children with	5	165	
		Matches, mice with	1	250	
		Mattress against stove	1	8	
		Paper too near stove	1	697	
		Phosphorus igniting	1	85	
		Smokers' carelessness	28	1,966	
		Sparks from burner	1	12	
		Sparks from burning rubbish	4	16,244	
		Sparks from bush fire	5	19,780	
		Sparks from chimney	186	58,082	
		Sparks from engine	1	2,750	
		Sparks from fireplace	26	1,597	
		Sparks from furnace	1	150	
		Sparks from stove	10	10,959	
		Spirit-heater upset	1	300	
		Spontaneous combustion	2	95	
		Stove explosion	3	5,346	
		Stove or stove-pipe insufficiently protected	28	11,882	
		Tar boiling over	1	1,500	
		Torch carelessness	1	100	
		Unknown	64	111,588	
		Wood too near stove	2	917	
					401,329
Dye-works	1	Spontaneous combustion	1	.....	10
Electrical workshops	1	Unknown	1	.....	8,200
Factories (box)	1	Unknown	1	.....	151
Factories (biscuit)	1	Defective oven	1	.....	4,356
Factories (casket)	1	Defective chimney	1	.....	11,300
Factories (fruit-packing)	1	Exposure	1	.....	14,000
Factories (glove)	1	Smokers' carelessness	1	.....	35
Factories (hop)	1	Unknown	1	.....	56,134
Factories (paint)	2	Electrical appliances	1	$ 61	
		Sparks from motor	1	13,469	
					13,530
Factories (pulley)	1	Rubbish too near stove	1	.....	20
Factores (sash and door)	1	Unknown	1	.....	378
Factories (soda-water)	1	Sparks from chimney	1	.....	30
Factories (wood-working)	1	Defective wiring	1	.....	257
Fences	1	Spark from bush fire	1	.....	40
Fire-halls	1	Unknown	1	.....	3,500
Fish-curing plants	1	Stove-pipe insufficiently protected	1	.....	343
Foundries	6	Defective forge	1	$ 25	
		Retort insufficiently protected	1	50	
		Sparks from chimney	1	3	
		Sparks from torch	1	501	
		Unknown	2	7,641	
					8,220
Garages	17	Ashes against wood	1	$ 50	
		Defective chimney	1	30	
		Defective wiring	1	55	
		Electrical appliances	1	81	
		Exposure	1	3,000	
		Gasolene carelessness	1	373	
		Incendiary	1	900	
		Match carelessness	1	50	
		Smokers' carelessness	2	1,170	
		Sparks from exhaust in automobile	1	1,000	
		Unknown	6	19,873	
					26,582

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Gas plants	3	Defective wiring	1	$ 75	
		Gas-cylinder exploding	1	513	
		Unknown	1	800	
					1,388
Gasolene-saws	1	Unknown	1	.....	30
Greenhouses	1	Sparks from chimney	1	.....	50
Halls	1	Defective stove	1	.....	38
Hospitals	2	Gasolene carelessness	1	$ 30	
		Sparks from chimney	1	10	
					40
Hotels	53	Defective chimney	1	$ 147	
		Defective oil-burner	1	345	
		Electrical appliances	1	37	
		Exposure	5	21,410	
		Furnace-pipe insufficiently protected	1	60	
		Incendiary	2	11,105	
		Lamp explosion	2	154	
		Live coals	1	25	
		Match carelessness	1	18	
		Smokers' carelessness	29	2,610	
		Sparks from chimney	6	16,660	
		Stove-pipe insufficiently protected	1	97	
		Unknown	2	11,145	
					63,813
Hay-presses	1	Carburettor back-firing	1	.....	75
Incinerators	1	Insufficiently protected	1	.....	2,000
Launches	6	Carburettor back-firing	1	$ 5	
		Defective wiring	1	225	
		Gasolene carelessness	1	60	
		Fat boiling over, igniting gasolene	1	100	
		Lamp explosion	1	150	
		Unknown	1	500	
					1,040
Laundries	7	Clothes too near stove	1	$ 600	
		Defective chimney	1	20	
		Gasolene carelessness	1	200	
		Smokers' carelessness	1	25	
		Sparks from chimney	1	50	
		Stove-pipe insufficiently protected	1	150	
		Unknown	1	10	
					1,055
Logging camps	10	Defective wiring	1	$ 65	
		Smokers' carelessness	1	1,321	
		Sparks from burner	1	14,800	
		Sparks from bush fire	6	28,785	
		Unknown	1	8,338	
					53,309
Lumber-mills	3	Boiler insufficiently protected	1	$ 1,800	
		Defective furnace	1	12,000	
		Unknown	1	7,500	
					21,300
Machine-shops	3	Sparks from chimney	1	$ 190	
		Stove-pipe insufficiently protected	1	105	
		Unknown	1	30	
					325
Mess-houses	2	Defective stove	1	$ 180	
		Unknown	1	10	
					190
Mining property	4	Hot bearing	1	$ 51,662	
		Lightning	1	4,753	
		Sparks from chimney	1	50,000	
		Spontaneous combustion	1	35,000	
					141,415
Motor-cycles	2	Carburettor back-firing	2	.....	120
Offices	11	Defective boiler	1	$ 225	
		Defective wiring	1	65	
		Exposure	2	6,500	
		Gasolene carelessness	1	475	
		Smokers' carelessness	2	541	
		Sparks from chimney	1	11	
		Stove explosion	1	60	
		Tar boiling over	1	60	
		Thawing pipes	1	2	
					7,939
Paving plant	1	Chute casing insufficiently protected	1	.....	40
Printing-offices	6	Defective furnace	1	$ 322	
		Exposure	1	6,000	
		Incendiary	1	380	
		Sparks from chimney	1	420	
		Sparks from motor igniting oil	1	150	
		Stove-pipe insufficiently protected	1	322	
					7,972

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Pulp-mills	2	Hot casting	1	$ 897	
		Sparks from chimney	1	8,124	
					9,021
Railway-tracks	1	Unknown	1	.....	2,438
Restaurants	12	Clothes too near stove	1	$ 222	
		Defective stove	1	20	
		Defective wiring	1	1,730	
		Exposure	2	4,400	
		Grease on stove	1	34	
		Incendiary	1	1,730	
		Lamp explosion	1	4,500	
		Smokers' carelessness	1	1,207	
		Stove-pipe insufficiently protected	1	250	
		Unknown	2	13,900	
					28,863
Rooming-houses	15	Ashes against wood	2	$ 39	
		Defective chimney	2	17	
		Defective furnace	1	175	
		Defective stove-pipe	1	15	
		Incendiary	1	165	
		Lightning	1	8	
		Smokers' carelessness	4	138	
		Sparks from chimney	2	75	
		Sparks from rubbish	1	3,200	
					3,832
Sawmills	18	Exposure	1	$ 1,460	
		Hot bearing	2	45,450	
		Incendiary	1	3,200	
		Sparks from burner	2	740	
		Sparks from chimney	2	39,049	
		Sparks from fireplace	1	1,725	
		Unknown	9	98,804	
					190,428
Sawing-machines	1	Engine back-firing	1	.....	23
Schools	6	Defective stove	1	$ 15	
		Incendiary	1	307	
		Sparks from chimney	3	52	
		Water on sodium	1	50	
					424
Sheds	19	Ashes against wood	1	$ 10	
		Gasolene carelessness	1	10	
		Grease on stove	1	50	
		Incendiary	2	17	
		Lamp explosion	1	80	
		Live coals	2	20	
		Matches, children with	1	5	
		Sparks from burner	1	2,352	
		Sparks from bush fire	2	402	
		Sparks from chimney	3	618	
		Unknown	4	1,175	
					4,739
Shingle-mills	7	Exposure	1	$ 950	
		Sparks from burner	1	10	
		Sparks from engine	1	14,950	
		Unknown	4	35,626	
					51,536
Shipyards	1	Sparks from motor	1	.....	1,327
Skating-rinks	1	Clothes too near stove	1	.....	10
Smelters	4	Defective furnace	1	.....	
		Defective melting-pot	1	$ 215	
		Sparks from chimney	1	50	
		Sparks from stove	1	10	
				1,047	
					1,322
Spice-mills	1	Electrical appliances	1	.....	46
Stables	5	Incendiary	2	$ 2,300	
		Spontaneous combustion	1	3,223	
		Unknown	2	209	
					5,732
Stations	1	Exposure	1	.....	175
Stores	70	Ashes against wood	2	$ 775	
		Coal-oil carelessness	1	26	
		Defective chimney	1	305	
		Defective stove	1	25	
		Defective wiring	1	3,000	
		Electrical appliances	1	59	
		Exposure	19	76,860	
		Gasolene carelessness	3	5,987	
		Incendiary	1	1,797	
		Lamp explosion	1	4,700	
		Rubbish around stove or furnace	1	400	
		Smokers' carelessness	13	6,440	
		Sparks from burning rubbish	2	170	
		Sparks from bush fire	1	5,500	
		Sparks from chimney	4	10,770	
		Sparks from furnace	1	160	
		Stove-pipe insufficiently protected	1	1,875	
		Unknown	16	56,821	
					175,670

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Stores and offices over	11	Defective stove	1	$ 26,822	
		Exposure	1	422	
		Incendiary	2	32,801	
		Match carelessness	1	25	
		Smokers' carelessness	3	78	
		Sparks from chimney	1	48	
		Unknown	2	8,397	
					68,593
Stores and rooms over	29	Ashes against wood	1	$ 10	
		Boiler insufficiently protected	1	59	
		Clothes too near stove	1	3	
		Defective stove	1	42	
		Defective wiring	1	457	
		Exposure	2	11,226	
		Grease on stove or range	1	55	
		Incendiary	1	65	
		Match carelessness	1	50	
		Smokers' carelessness	10	694	
		Sparks from stove	2	29	
		Stove insufficiently protected	1	892	
		Unknown	6	70,926	
					84,508
Street-cars	10	Defective wiring	9	$ 212	
		Electrical appliances	1	12	
					224
Theatres	2	Defective wiring	1	$ 162	
		Film igniting	1	25	
					187
Transformers	2	Defective wiring	1	$ 600	
		Defective transformer	1	200	
					800
Tug-boats	5	Boiler insufficiently protected	1	$ 510	
		Defective furnace	1	2,200	
		Defective stove	1	2,000	
		Lamp explosion	1	3,500	
		Unknown	1	450	
					8,660
Warehouses	14	Exposure	4	$ 55,216	
		Smokers' carelessness	1	3,000	
		Sparks from chimney	1	132	
		Sparks from engine	1	22,609	
		Stove-pipe insufficiently protected	1	150	
		Unknown	6	36,642	
					117,749
Wharves	2	Sparks from burner	1	$ 5,000	
		Unknown	1	50,000	
					55,000
Totals	1,182		1,182	.....	$2,635,532

TABLE VIII.—SUMMARY.

	Fires reported.				Amount of Loss.			
	Cities (35).	Other Municipalities (28).	Insurance Districts (15).	Total.	Cities (35).	Other Municipalities (28).	Insurance Districts (15).	Total.
1920.								
January	51	24	13	88	$ 23,527	$ 20,196	$ 20,385	$ 64,108
February	75	17	12	104	29,877	9,538	27,499	66,914
March	71	17	16	104	11,181	45,730	79,043	135,954
April	90	20	12	122	111,662	21,648	217,174	350,484
May	68	25	16	109	59,067	77,572	34,993	171,632
June	53	11	6	70	129,047	12,529	5,746	147,322
July	78	23	16	117	54,405	256,797	43,297	354,499
August	96	31	21	148	320,879	75,286	68,562	464,727
September	38	10	9	57	83,570	94,364	126,821	304,755
October	55	16	11	82	91,676	23,709	54,407	169,792
November	62	12	13	87	77,066	2,457	27,837	107,360
December	50	13	31	94	91,575	4,725	201,685	297,985
Totals, 1920	787	219	176	1,182	$1,083,532	$ 644,551	$ 907,449	$2,635,532
Totals, 1919	853	204	164	1,221	1,013,890	413,266	500,736	1,927,892
Totals, 1918	619	220	105	944	800,668	863,306	431,252	2,095,226
Totals, 1917	422	123	117	662	756,427	227,442	558,009	1,541,878
Totals, 1916	496	172	...	668	1,041,440	339,512	.....	1,380,952
Grand totals	3,177	938	562	4,677	$4,695,957	$2,488,077	$2,397,446	$9,581,480

TABLE IX.—LOSS OF LIFE, 1916–20.

Occupancy.	Cause of Fire.	Loss of Life.	
		Adults.	Children.
Apartments	Unknown	5	..
Gas plant	Gas-cylinder exploded	1	..
Dwelling	Child upsetting oil-lamp	..	1
Dwelling	Incendiary	1	..
Dwelling	Stove exploded	1	..
Restaurant	Unknown	1	..
Stores and Rooms	Unknown	3	..
Totals		12	1
Totals, 1919		2	5
Totals, 1918		4	..
Totals, 1917		8	1
Totals, 1916		6	9

TABLE X.—INVESTMENTS IN BRITISH COLUMBIA OF COMPANIES OTHER THAN LIFE INSURANCE COMPANIES.

(For British Columbia investments of Life Insurance Companies *see* Abstract of Returns of Life Insurance Companies, *post.*)

Name of Company.	Mortgages.	In other Securities.
American Central Insurance Co.	.....	$ 30,660 00*
Boiler Inspection & Insurance Co. of Canada	.....	44,000 00*
British America Assurance Co.	.....	156,000 00*
British Columbia Plate Glass Insurance Co.	.....	5,973 33
British Colonial Fire Insurance Co.	.....	3,000 00
British Crown Assurance Corporation, Ltd.	.....	15,000 00*
British Northwestern Fire Insurance Co.	$ 1,500 00	2,000 00
Caledonian Insurance Co., Ltd.	858,061 52	259,460 73
California Insurance Co.	.....	21,200 00†
Canada Accident & Fire Assurance Co.	.....	19,000 00
Canada National Fire Insurance Co.	77,577 06	.....
Canadian Surety Co.	.....	25,733 33*
Century Insurance Co., Ltd.	.....	26,000 00*
Commercial Union Assurance Co., Ltd.	239,906 16	.....
Dominion Fire Insurance Co.	12,500 00	80,353 33*
Dominion of Canada Guarantee & Accident Insurance Co.	.....	99,000 00*
General Accident Assurance Co. of Canada	.....	32,854 06*
General Accident Fire & Life Assurance Co., Ltd.	.....	42,413 52*
Glens Falls Insurance Co.	.....	66,500 00
Globe & Rutgers Fire Insurance Co.	.....	48,180 00*
Globe Indemnity Co. of Canada	.....	5,000 00
Guardian Insurance Co. of Canada	.....	39,333 33
Hartford Fire Insurance Co.	.....	76,000 00*
Home Insurance Co.	.....	50,000 00*
Hudson Bay Insurance Co.	98,648 95	29,000 00*
Imperial Guarantee & Accident Insurance Co.	.....	29,676 50‡
Imperial Underwriters Corporation of Canada	80,821 00	30,434 75‡
Insurance Co. of the State of Pennsylvania	.....	53,200 00*
Law, Union & Rock Insurance Co., Ltd.	408,430 00	19,806 00
Liverpool-Manitoba Assurance Co.	.....	30,000 00*
London Assurance Corporation	.....	141,500 00
London Mutual Fire Insurance Co. of Canada	.....	51,850 55
Loyal Protective Insurance Co.	.....	10,000 00
Maritime Insurance Co., Ltd.	.....	37,500 00
Maryland Casualty Co.	.....	62,719 65
Mount Royal Assurance Co.	.....	11,512 51‡
National Ben Franklin Fire Insurance Co.	.....	87,220 00*
National Fire Insurance Co. of Hartford	.....	22,984 75
National Union Fire Insurance Co.	.....	35,000 00*
North American Accident Insurance Co.	.....	4,937 50‡
North British & Mercantile Insurance Co.	409,500 00	147,000 00*
North Empire Fire Insurance Co.	.....	45,000 00‡
Northern Assurance Co., Ltd.	.....	250,000 00
Northwestern National Insurance Co.	.....	41,970 33†
Norwich Union Fire Insurance Society, Ltd.	.....	75,200 00
Pacific Coast Fire Insurance Co.	86,225 66	607,171 15
Pacific Marine Insurance Co.	20,000 00	7,500 00‡
Phoenix Insurance Co.	.....	18,400 00
Queen Insurance Co. of America	.....	32,000 00*
Royal Insurance Co., Ltd.	280,000 00	214,850 67
Royal Plate Glass Insurance Co. of Canada	.....	2,250 00
Springfield Fire & Marine Insurance Co.	.....	45,000 00
Yorkshire Insurance Co., Ltd.	536,479 00	.....
Totals	$3,109,649 35	$3,291,345 99

* Par value. † Market value. ‡ Book value.

TABLE XI.—ABSTRACT OF THE RETURNS OF LIFE INSURANCE COMPANIES TRANSACTING BUSINESS IN THE PROVINCE OF BRITISH COLUMBIA, 1920.

Name of Company.	Premiums for the Year.	Number of Policies, new and taken up.	Amount of Policies new and taken up.	Number of Policies in Force at Date.	Net Amount in Force.	Number of Policies become Claims.	Net Amount of Policies become Claims.	Claims paid including Matured Endowments.	Unsettled Claims.		Amount invested in British Columbia.	
									Not resisted.	Resisted.	On Mortgages.	In other Securities.
1. Aetna Life Insurance Co.	$ 13,205 12	27	$ 137,012 29	278	$ 696,586 10	3	$ 3,089 00	$ 3,000 00	$ 89 00	*Nil.*	*Nil.*	‖ $691,386 66
2. Canada Life Assurance Co.	316,621 79	655	1,735,017 00	3,740	9,171,515 00	.....	111,678 00	96,201 35	28,233 70	*Nil.*	$ 796,738 29	* 1,591,380 62
3. Capital Life Assurance Co.	1,741 35	.....	*Nil.*	20	50,000 00	.....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	† 34,715 00
4. Confederation Life Association	288,432 47	897	2,199,732 00	.....	9,082,465 00	.....	69,390 00	81,719 00	4,000 00	*Nil.*	1,081,676 55	* 507,587 72
5. Continental Life Insurance Co.	47,770 34	163	311,750 00	884	1,490,312 00	2	2,000 00	1,000 00	2,000 00	*Nil.*	*Nil.*	† 184,036 21
6. Crown Life Insurance Co.	110,634 88	.....	1,038,901 00	.....	4,078,364 00	.....	19,000 00	16,000 00	4,000 00	*Nil.*	14,275 00	* 93,721 48
7. Dominion Life Assurance Co.	71,005 78	480	1,000,935 00	.....	1,811,532 00	.....	6,225 00	8,130 00	3,145 00	*Nil.*	80,543 75	* 141,227 73
8. Equitable Life Assurance Society.	72,771 75	27	72,782 00	996	2,123,654 00	45	94,411 04	86,226 04	8,185 00	*Nil.*	353,000 00	† 335,000 00
9. Excelsior Life Insurance Co.	81,797 55	240	555,000 00	.....	2,409,265 00	16	32,265 00	29,765 00	7,500 00	*Nil.*	*Nil.*	*Nil.*
10. Great West Life Assurance Co.	697,067 39	.....	5,119,409 00	.....	20,708,284 00	.....	139,790 00	139,916 40	15,398 70	*Nil.*	388,877 04	* 224,361 46
11. Imperial Life Assurance Co.	281,421 29	974	2,167,669 00	4,025	8,118,392 00	.....	70,423 10	81,421 10	3,200 00	*Nil.*	107,080 01	* 293,019 51
12. London Life Insurance Co.	84,402 94	685	1,086,250 00	1,618	2,474,981 50	5	5,870 00	5,335 00	600 00	*Nil.*	*Nil.*	† 933,694 20
13. London & Scottish Assurance Corporation, Ltd.	31,088 00	31	67,000 00	.....	993,748 00	24	43,251 00	41,451 00	2,800 00	*Nil.*	*Nil.*	* 163,410 00
14. Manufacturers Life Insurance Co.	144,712 99	398	977,466 00	1,592	3,241,225 00	21	31,370 00	29,947 00	3,423 40	*Nil.*	6,855 50	† 514,568 42
15. Metropolitan Life Insurance Co. { Ordinary	353,194 80	2,884	3,310,000 00	11,791	11,210,000 00	54	47,602 39	48,102 39	1,000 00	$1,000	.....	.....
{ Industrial	309,820 75	1,518	1,930,000 00	58,661	7,740,000 00	403	39,644 93	39,783 93	100 00	150	1,980 00	† 1,106,832 84
16. Monarch Life Assurance Co.	198,573 92	.....	1,991,067 00	2,777	6,780,911 00	.....	8,088 10	13,088 10	1,000 00	*Nil.*	23,930 60	† 70,065 98
17. Mutual Life Assurance Co. of Canada.	538,562 62	1,685	3,683,927 00	7,712	14,811,695 00	60	104,180 00	101,680 00	21,000 00	*Nil.*	440,663 52	† 942,017 66
18. Mutual Life Insurance Co. of N.Y.	99,508 65	163	480,986 80	1,733	3,416,867 00	33	50,400 00	53,465 00	12,589 00	*Nil.*	*Nil.*	*Nil.*
19. National Life Assurance Co. of Canada.	67,074 83	220	560,603 00	.....	2,260,139 00	.....	41,177 00	37,177 00	4,000 00	*Nil.*	*Nil.*	*Nil.*
20. New York Life Insurance Co.	443,254 84	672	1,798,980 00	5,690	12,321,622 00	64	143,788 98	159,542 43	14,659 00	*Nil.*	991,500 00	‖ 100,000 00
21. North American Life Assurance Co.	317,613 19	1,011	2,243,684 00	4,152	8,365,829 00	.....	91,159 00	102,805 30	2,060 73	*Nil.*	637,652 67	* 976,241 79
22. Northern Life Assurance Co.	32,435 20	.....	401,200 00	.....	1,040,882 00	.....	2,136 05	2,136 05	2,000 00	.....	5,000 00	135,428 01
23. Norwich Union Life Insurance Society.	81 01	.....	.....	.....	2,433 33	.....	.....	.....	.....	.....	92,000 00	* 33,846 67
24. Phoenix Assurance Co., Ltd.	11,046 17	2	3,000 00	166	430,644 20	3	13,602 80	13,602 80	*Nil.*	*Nil.*	*Nil.*	‡ 53,249 16
25. Prudential Assurance Co. of { Ordinary	158,330 97	1,047	1,289,016 00	4,837	5,510,033 00	25	27,087 80	29,087 80	1,000 00	*Nil.*	*Nil.*	.....
America { Industrial	194,089 20	6,069	1,245,840 00	32,038	5,027,958 00	164	25,193 32	25,583 14	1,097 25	*Nil.*	*Nil.*	† 354,097 83
26. Royal Insurance Co., Ltd.	96,908 93	.....	832,026 00	.....	3,446,021 67	.....	110,326 00	43,737 89	1,200 00	*Nil.*	*Nil.*	‡ 34,651 40
27. Sovereign Life Assurance Co.	46,006 49	68	187,000 00	570	1,286,292 00	3	9,000 00	10,000 00	*Nil.*	*Nil.*	*Nil.*	* 64,443 76
28. Standard Life Assurance Co.**	36,204 71	38	114,247 00	543	1,069,091 36	14	27,040 73	23,970 13	6,582 28	*Nil.*	235,000 00	* 176,848 60
29. Sun Life Assurance Co. of Canada.	604,118 47	1,667	4,120,722 00	8,737	16,573,111 00	.....	134,581 15	117,762 07	45,389 72	*Nil.*	912,677 25	* 3,191,054 89
30. Travelers Insurance Co.	41,600 38	184	911,121 00	475	2,105,415 00	.....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	‖ 560,999 00
31. Travellers Life Assurance Co. of Canada	2,988 80	11	41,980 00	55	151,660 00	.....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	* 9,524 52
32. Union Mutual Life Insurance Co.	18,426 86	.....	29,000 00	282	555,500 00	5	6,248 53	8,367 47	1,108 01	*Nil.*	*Nil.*	* 129,966 67
33. Western Empire Life Assurance Co.	12,870 44	85	165,500 00	227	395,650 00	.....	1,000 00	3,500 00	*Nil.*	*Nil.*	12,400 00	15,319 60
34. Western Life Assurance Co.	22,418 27	.....	240,000 00	.....	697,550 00	.....	5,943 40	6,000 00	1,943 40	*Nil.*	*Nil.*	* 6,254 81
	$5,847,803 14	.....	$42,048,823 09	.....	$171,649,628 16	.....	$1,515,962 32	$1,459,503 39	$199,304 19	$ 1,150	$6,181,850 18	$ 13,673,952 20

* Basis of valuation not stated. † Book value. ‡ Including loans on policies. ‖ Par value. ** Year ended November 15th, 1920.

	Marine.		Live Stock, Steam-boiler, Sprinkler Leakage, Inland Transportation, Explosion, and Tornado. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	Premiums.	Losses.	Premiums.	Losses.				
...	$ 81,419 46	$ 24,457 43	.....	.....	$ 91,291 66	$ 28,154 04	$ 27,670 39	1
...	3,875 99	352 41	.....	.....	10,864 87	1,996 78	*Nil.*	2
...	1,224 82	682 51	I.T. $136 25	*Nil.*	2,220 32	1,756 31	166 25	3
...	.....	.....	.....	.....	464 59	*Nil.*	59 00	4
...	.....	.....	S.B. 1,101 59	*Nil.*	1,101 59	*Nil.*	*Nil.*	5
...	2,019 59	2,861 03	.....	.....	2,019 59	2,861 03	*Nil.*	6
...	9,319 09	519 24	.....	.....	9,319 09	519 24	*Nil.*	7
...	465 64	*Nil.*	.....	.....	13,585 53	3,783 31	*Nil.*	8
) 13	.....	.....	.....	.....	28,116 64	16,000 13	910 14	9
...	.....	.....	.....	.....	33,725 37	24,789 43	1,185 00	10
...	2,612 92	1,016 71	.....	.....	6,102 55	2,180 61	*Nil.*	11
17	.....	.....	.....	.....	33,141 54	26,379 15	1,250 00	12
...	.....	.....	.....	.....	1,139 65	148 85	*Nil.*	13
...	.....	.....	.....	.....	11,759 11	4,922 77	25 55	14
...	34,894 30	12,365 60	.....	.....	34,894 30	12,365 60	8,100 00	15
...	.....	.....	.....	.....	1,401 01	174 41	1,314 00	16
...	.....	.....	.....	.....	68,230 03	33,506 44	5,574 14	17
...	.....	.....	E. 782 26 T. 40 62	*Nil.* *Nil.*	2,128 35	243 35	*Nil.*	18
...	.....	.....	I.T. 131 25	$ 4 80	37,552 15	16,864 33	*Nil.*	19
) 31	.....	.....	.....	.....	104,386 68	42,223 22	*Nil.*	20
...	29,170 48	19,853 53	.....	.....	31,084 73	19,853 53	*Nil.*	21
...	.....	.....	.....	.....	40,352 13	25,515 45	*Nil.*	22
...	.....	.....	.....	.....	113 79	1 11	*Nil.*	23
) 39	.....	.....	S.B. 505 86	*Nil.*	8,210 81	2,261 17	*Nil.*	24
...	.....	.....	E. 746 82 T. 40 62	*Nil.* *Nil.*	2,092 88	243 35	*Nil.*	25
...	46,673 24	41,567 44	.....	.....	53,517 17	45,651 83	359 00	26
..	67 94	42 58	.....	.....	67 94	42 58	*Nil.*	27
...	.....	.....	S.B. 556 60	83 50	28,410 31	5,251 02	200 00	28
..	.....	.....	.....	.....	2,837 32	1,539 36	858 00	29
...	.....	.....	L.S. 651 13	*Nil.*	651 13	*Nil.*	750 00	30
...	81 53	*Nil.*	E. 20 15	*Nil.*	274 98	109 40	10 00	31
...	.....	.....	I.T. 25 00 E. 1,547 27	*Nil.* *Nil.*	2,695 76	*Nil.*	*Nil.*	32
...	.....	.....	.....	.....	40,290 42	22,463 93	2,822 50	33
...	19,348 66	8,361 38	E. 12 50	*Nil.*	55,735 70	31,852 50	9,711 07	34
...	.....	.....	L.S. 648 00	300 00	648 00	300 00	*Nil.*	35
...	.....	.....	.....	.....	11,378 17	*Nil.*	*Nil.*	36
) 25	.....	.....	.....	.....	8,692 30	8,444 31	2,036 64	37
...	.....	.....	S.L. 258 10	*Nil.*	7,890 98	2,479 17	*Nil.*	38
...	.....	.....	E. 794 02	*Nil.*	5,557 93	1,766 16	540 00	39
) 22	.....	.....	.....	.....	23,417 92	17,008 00	2,890 00	40
...	47,960 47	30,390 93	I.T. 981 16	55 25	79,320 04	50,155 73	5,174 25	41
...	.....	.....	.....	.....	9,117 73	1,622 03	890 00	42
) 54	.....	.....	.....	.....	3,289 85	1,216 54	43 46	43
) 84	.....	.....	.....	.....	44,823 94	26,428 46	4,865 25	44
...	2,131 54	53 54	.....	.....	2,131 54	53 54	*Nil.*	45
..	7,621 07	481 45	.....	.....	20,415 52	3,444 23	1,000 00	46
...	.....	.....	.....	.....	71,038 14	34,506 69	28,985 00	47
...	.....	.....	.....	.....	1,496 09	*Nil.*	*Nil.*	48
...	.....	.....	.....	.....	7,045 50	2,379 72	720 00	49
...	.....	.....	.....	.....	1,552 94	*Nil.*	*Nil.*	50

NAME OF COMPANY.	Accident.		Sickness.		Liability.		Automobile.		Burglary.		Guarantee.		Plate Glass.		Marine.		Live Stock, Steam-boiler, Sprinkler Leakage, Inland Transportation, Explosion, and Tornado. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.				
1. Aetna Insurance Co.							$ 9,872 20	$ 3,696 61							$ 81,419 46	$ 24,457 43			$ 91,291 66	$ 28,154 04	$ 27,670 39	1
2. Alliance Assurance Co., Ltd.	$ 506 70	$ 16 65	$ 211 50	$ 221 65	$ 371 90	*Nil.*	4,405 90	1,212 57	$ 1,335 33	$ 193 50	$ 157 55	*Nil.*			3,875 99	352 41			10,864 87	1,996 78	*Nil.*	2
3. Alliance Insurance Co. of Philadelphia							859 25	1,073 80							1,224 82	682 51	I.T. $136 25	*Nil.*	2,220 32	1,756 31	166 25	3
4. American Alliance Insurance Co.							464 59	*Nil.*											464 59	*Nil.*	59 00	4
5. Boiler Inspection & Insurance Co. of Canada																	S.B. 1,101 59	*Nil.*	1,101 59	*Nil.*	*Nil.*	5
6. Boston Insurance Co.															2,019 59	2,861 03			2,019 59	2,861 03	*Nil.*	6
7. British & Foreign Marine Insurance Co.															9,319 09	519 24			9,319 09	519 24	*Nil.*	7
8. British America Assurance Co.							13,119 89	3,783 31							465 64	*Nil.*			13,585 53	3,783 31	*Nil.*	8
9. British Columbia Plate Glass Insurance Co.													$ 28,116 64	$ 16,000 13					28,116 64	16,000 13	910 14	9
10. British Crown Assurance Corporation, Ltd.							33,725 37	24,789 43											33,725 37	24,789 43	1,185 00	10
11. British Traders Insurance Co., Ltd.							3,489 63	1,163 90							2,612 92	1,016 71			6,102 55	2,180 61	*Nil.*	11
12. Canada Accident & Fire Assurance Co.	7,538 56	$ 15,305 17	6,233 15	2,928 84	2,373 14	$ 884 90	13,923 88	5,118 77	813 98	470 30	344 43	*Nil.*	1,914 40	1,671 17					33,141 54	26,379 15	1,250 00	12
13. Canadian Fire Insurance Co.							1,139 65	148 85											1,139 65	148 85	*Nil.*	13
14. Canadian Surety Co.							4,049 58	1,927 77	652 73	45 00	7,024 54	$ 2,950 00	32 26	*Nil.*					11,759 11	4,922 77	25 55	14
15. Canton Insurance Office, Ltd.																						
16. Car & General Insurance Corporation, Ltd.	60 00	*Nil.*	60 72	58 92			1,280 29	115 49							34,894 30	12,365 60			34,894 30	12,365 60	8,100 00	15
17. Continental Casualty Co.	29,484 93	17,633 76	29,883 66	11,918 23	644 32	*Nil.*	8,217 12	3,954 45											1,401 01	174 41	1,314 00	16
18. Continental Insurance Co.																			68,230 03	33,506 44	5,574 14	17
19. Dominion Gresham Guarantee & Casualty Co.							1,305 47	243 35									E. 782 26 T. 40 62	*Nil.* *Nil.*	2,128 35	243 35	*Nil.*	18
20. Dominion of Canada Guarantee & Accident Insurance Co.	9,286 99	2,939 53	14,059 68	5,701 26	475 95	7 60	12,278 20	7,581 64	925 22	629 50	394 86	*Nil.*					I.T. 131 25	$ 4 80	37,552 15	16,864 33	*Nil.*	19
21. Eagle Star & British Dominions Insurance Co., Ltd.	* 69,590 28	18,131 41					27,499 55	11,156 87	647 60	744 35	3,736 29	9,771 28	2,912 96	2,419 31					104,386 68	42,223 22	*Nil.*	20
22. Employers Liability Assurance Corporation, Ltd.							1,914 25	*Nil.*							29,170 48	19,353 53			31,084 73	19,353 53	*Nil.*	21
23. Equitable Fire & Marine Insurance Co.	5,561 42	2,607 32	7,313 76	5,004 13	2,582 87	438 40	20,607 03	17,387 60	1,466 46	78 00	2,820 59	*Nil.*							40,352 13	25,515 45	*Nil.*	22
24. Fidelity & Casualty Company	840 37	169 99	872 48	180 71	599 40	256 43	113 79	1 11											113 79	1 11	*Nil.*	23
25. Fidelity Phenix Fire Insurance Co.							1,264 14	686 65	3,243 18	575 00			885 38	392 39			S.B. 505 86 E. 746 82 T. 40 62	*Nil.* *Nil.* *Nil.*	8,210 81	2,261 17	*Nil.*	24
26. Fireman's Fund Insurance Co.							1,305 44	243 35											2,092 88	243 35	*Nil.*	25
27. Firemen's Insurance Co. of Newark							6,843 93	4,084 39							46,673 24	41,567 44			53,517 17	45,651 83	359 00	26
28. General Accident Assurance Co. of Canada	1,906 82	130 17	1,013 43	811 22	3,828 77	1,809 60	12,134 31	2,416 53	42 66	*Nil.*	8,927 72	*Nil.*			67 94	42 58			67 94	42 58	*Nil.*	27
29. General Accident Fire & Life Assurance Corporation, Ltd.							2,837 32	1,539 36									S.B. 556 60	83 50	28,410 31	5,251 02	200 00	28
30. General Animals Insurance Co. of Canada																			2,837 32	1,539 36	858 00	29
31. Glens Falls Insurance Co.							173 30	109 40							81 53	*Nil.*	L.S. 651 13 E. 20 15	*Nil.* *Nil.*	651 13 274 98	*Nil.* 109 40	750 00 10 00	30 31
32. Globe & Rutger's Fire Insurance Co.							1,123 49	*Nil.*									I.T. 25 00 E. 1,547 27	*Nil.* *Nil.*	2,695 76	*Nil.*	*Nil.*	32
33. Globe Indemnity Co. of Canada	13,056 50	7,623 37	9,506 36	8,074 47	2,170 21	345 00	11,885 05	7,105 05	443 38	21 75	3,228 92	705 71							40,290 42	22,463 93	2,822 50	33
34. Great American Insurance Co.							36,374 54	23,491 12							19,348 66	8,361 38	E. 12 50	*Nil.*	55,735 70	31,852 50	9,711 07	34
35. Great North Insurance Co.																	L.S. 648 00	300 00	648 00	300 00	*Nil.*	35
36. Guarantee Co. of North America											11,378 17	*Nil.*							11,378 17	*Nil.*	*Nil.*	36
37. Guardian Insurance Co. of Canada	*2,967 72	3,413 49			145 48	405 00	4,701 43	2,315 57	441 40	1,925 00	216 25	*Nil.*	220 02	385 25					8,692 30	8,444 31	2,036 64	37
38. Hartford Fire Insurance Co.							7,632 88	2,479 17									S.L. 258 10	*Nil.*	7,890 98	2,479 17	*Nil.*	38
39. Home Insurance Co.							4,763 91	1,766 16									E. 794 02	*Nil.*	5,557 93	1,766 16	540 00	39
40. Imperial Guarantee & Accident Insurance Co.	8,909 95	9,014 20	5,527 77	1,548 92	35 00	*Nil.*	7,340 73	3,382 03			947 83	2,388 63	656 64	674 22					23,417 92	17,008 00	2,890 00	40
41. Insurance Co. of North America							30,378 41	19,709 55							47,960 47	30,390 93	I.T. 981 16	55 25	79,320 04	50,155 73	5,174 25	41
42. Law Union & Rock Insurance Co., Ltd.	1,282 55	348 75	725 10	122 48	1,228 16		5,777 64	1,150 80					104 28	*Nil.*					9,117 73	1,622 03	890 00	42
43. Lloyds Plate Glass Insurance Co.													3,289 85	1,216 54					3,289 85	1,216 54	43 46	43
44. London & Lancashire Guarantee & Accident Co.	4,181 58	1,480 93	2,703 15	1,122 48	859 21	500 10	30,359 41	17,875 11			2,753 71	2,940 00	3,066 85	2,509 84					44,823 94	26,428 46	4,865 25	44
45. London & Provincial Marine & General Insurance Co., Ltd.															2,131 54	53 54			2,131 54	53 54	*Nil.*	45
46. London Assurance Corporation							12,794 45	2,962 78							7,621 07	481 45			20,415 52	3,444 23	1,000 00	46
47. London Guarantee & Accident Co., Ltd.	12,721 98	4,479 34	3,992 64	1,410 09	2,104 36	671 50	44,558 76	17,945 76			7,660 40	10,000 00							71,038 14	34,506 69	28,985 00	47
48. London Mutual Fire Insurance Co.							1,496 09	*Nil.*											1,496 09	*Nil.*	*Nil.*	48
49. Loyal Protective Insurance Co.	7,045 50	2,379 72																	7,045 50	2,379 72	720 00	49
50. Lumbermen's Mutual Casualty Co.							1,552 94	*Nil.*											1,552 94	*Nil.*	*Nil.*	50
51. Marine Insurance Co., Ltd.							3,069 56	81 79											3,069 56	81 79	*Nil.*	51
52. Maritime Insurance Co., Ltd.															32 00	*Nil.*			32 00	*Nil.*	*Nil.*	52
53. Maryland Assurance Corporation, Ltd.	699 33	75 85	868 97	711 80															1,568 30	787 65	*Nil.*	53
54. Maryland Casualty Co.	273 45	46 66	431 00	*Nil.*	435 00	127 00	4,015 78	2,608 95			640 98	*Nil.*	1,781 01	978 00			S.L. 304 65 S.B. 158 69	*Nil.* *Nil.*	8,040 56	3,760 61	1,221 00	54
55. Merchants Casualty Co.	47,668 39	17,621 04																	47,668 39	17,621 04	2,445 97	55
56. Motor Union Insurance Co., Ltd.							19,336 05	1,910 85											19,336 05	1,910 85	1,097 15	56
57. National Benefit Assurance Co., Ltd.															72 00	*Nil.*			72 00	*Nil.*	*Nil.*	57
58. National Fire Insurance Co. of Hartford							289 59	*Nil.*											289 59	*Nil.*	*Nil.*	58
59. National Provincial Plate Glass & General Insurance Co., Ltd.													2,336 90	1,804 92					2,336 90	1,804 92	*Nil.*	59
60. National Surety Co.									294 35	*Nil.*	2,135 63	964 73							2,429 98	964 73	2,001 00	60
61. Newark Fire Insurance Co.							366 55	*Nil.*											366 55	*Nil.*	*Nil.*	61
62. New Jersey Insurance Co.							1,377 64	1,299 68											1,377 64	1,299 68	316 25	62
63. New York Plate Glass Insurance Co.													4,773 36	3,553 07					4,773 36	3,553 07	513 02	63
64. New Zealand Insurance Co., Ltd. †																						64
65. Niagara Fire Insurance Co.							2,142 19	187 68							19,210 41	118 62	E. 56 50	*Nil.*	21,439 10	306 30	2,840 00	65
66. North American Accident Insurance Co.	3,413 59	1,181 43	763 48	278 21	773 45	25 00	838 39	279 44	50 00	*Nil.*			2,681 95	968 49					8,520 86	2,732 57	1,088 72	66
67. Northern Assurance Co., Ltd. †	2,083 30	286 23					7,403 05	1,000 60			288 20	*Nil.*	998 45	503 04					10,773 00	1,789 87	*Nil.*	67
68. Northwestern Mutual Fire Association							7,143 86	2,148 49											7,143 86	2,148 49	558 52	68
69. Northwestern National Insurance Co.							15,800 59	5,385 05											15,800 59	5,385 05	706 50	69
70. Norwich Union Fire Insurance Society, Ltd	11,411 16	6,622 32	10,179 43	4,461 28	544 50	477 60	8,548 05	4,228 14					1,528 12	366 61					32,211 26	16,155 95	4,404 00	70
71. Ocean Accident & Guarantee Corporation, Ltd.	*13,617 66	3,092 26			3,245 74	1,006 57	9,831 36	7,789 56	474 40	50 00	1,211 87	50 00	4,530 33	1,298 84					32,911 86	13,287 23	4,768 00	71
72. Ocean Marine Insurance Co., Ltd. †															2,638 05	94 25			2,638 45	94 25	*Nil.*	72
73. Occidental Fire Insurance Co.							2,525 27	190 95											2,525 27	190 95	810 00	73
74. Pacific Marine Insurance Co.							378 80	2 05											378 80	2 05	63 05	74
75. Palatine Insurance Co., Ltd.							637 70	47 92											637 70	47 92	150 00	75
76. Phœnix Insurance Co. of Hartford							24,276 72	18,399 08							9,886 06	3,285 29			34,162 78	21,684 37	3,466 75	76
77. Preferred Accident Insurance Co. of N.Y.							206 15	*Nil.*											206 15	*Nil.*	*Nil.*	77
78. Protective Association of Canada	*9,990 36	5,158 57																	9,990 36	5,158 57	*Nil.*	78
79. Queen Insurance Co. of America	5,494 61	1,775 80																	5,494 61	1,775 80	7,455 00	79
80. Queensland Insurance Co., Ltd.															3,198 45	4,507 97			3,198 45	4,507 97	*Nil.*	80
81. Railway Passengers Assurance Co.	8,919 83	4,008 50	4,963 25	1,817 20	2,724 18	358 59	24,887 89	7,155 26	309 40	*Nil.*	884 50	*Nil.*	1,437 70	1,190 18					44,126 75	14,529 73	2,790 00	81
82. Ridgely Protective Association	*2,370 83	1,219 27																	2,370 83	1,219 27	42 28	82
83. Reliance Marine Insurance Co. †															10,000 00	36,060 00			10,000 00	36,060 00	*Nil.*	83
84. Royal Exchange Assurance	550 43	2,896 17	365 20	128 92	23 03	*Nil.*	13,941 19	14,404 88											19,879 85	16,939 97	1,023 83	84
85. Royal Plate Glass Insurance Co. of Canada													4,925 22	2,997 94					4,925 22	2,997 94	628 76	85
86. St. Paul Fire & Marine Insurance Co.	568 89	*Nil.*													13,249 08	6,961 55	I. T. 208 66	5 60	14,026 63	6,967 15	6,722 05	86
87. Scottish Metropolitan Assurance Corporation, Ltd.	2,054 39	62 50	1,924 32	318 21	307 50	*Nil.*	3,588 70	553 12											7,874 91	933 83	*Nil.*	87
88. Scottish Union & National Insurance Co.							14,869 28	7,963 27											14,869 28	7,963 27	3,308 00	88
89. Standard Marine Insurance Co., Ltd.															20,076 64	11,575 04			20,076 64	11,575 04	2,225 00	89
90. Tokio Marine & Fire Insurance Co., Ltd.							43 50	*Nil.*							2,949 58	561 33			2,949 58	561 33	*Nil.*	90
91. Travelers Indemnity Co.	1,908 09	695 36	8,486 55	4,956 57															10,528 14	5,651 93	*Nil.*	91
92. Travelers Insurance Co.	16,166 96	1,869 51																	16,166 96	1,869 51	*Nil.*	92
93. Union Insurance Society of Canton, Ltd.							8,833 12	1,564 64							22,385 86	6,076 96			31,218 98	7,641 60	*Nil.*	93
94. Union Marine Insurance Co., Ltd.															137 50	127 85			137 50	127 85	*Nil.*	94
95. United States Fidelity & Guaranty Co.	2,358 86	36 42	941 00	*Nil.*	1,643 46	351 00	1,795 90	1,940 43	5,088 27	1,031 94	9,650 49	10,448 35	3,190 86	1,248 94					24,668 84	15,057 08	11,170 00	95
96. United States Fire Insurance Co.							1,391 10	1,411 26									E. 320 00	*Nil.*	1,711 10	1,411 26	285 00	96
97. United States Lloyds, Inc.															815 02	1,061 43			815 02	1,061 43	*Nil.*	97
98. Western Assurance Co.	22,000 56	16,993 01													18,430 74	25,131 94	E. 365 76 I.T. 1,628 94	*Nil.* 1,076 90	42,426 00	43,201 85	6,682 00	98
99. Western Casualty Company	17,113 71	4,987 80																	17,113 71	4,987 80	961 20	99
100. World Marine & General Insurance Co.															692 82	295 26			692 82	295 26	*Nil.*	100
101. Yang-tsze Insurance Association, Ltd.															25,671 98	18,225 32			25,671 98	13,225 32	*Nil.*	101
102. Yorkshire Insurance Co., Ltd.	4,434 07	285 71	4,079 53	405 27	189 00	*Nil.*							628 59	312 75			L.S. 294 81		9,626 00	1,003 73	485 82	102
Totals	$348,130 32	$154,088 21	$115,106 13	$52,190 86	$27,304 63	$7,664 29	$566,101 79	$273,180 39	$16,228 36	$5,764 34	$64,402 96	$38,807 28	$70,911 77	$40,491 63	$438,362 93	$253,088 59	$12,317 21	$1,526 05	$1,658,866 50	$825,792 64	$178,338 51	

* Accident and sickness. † Report not yet received.

TABLE XII.—LIFE INSURANCE SUMMARY.

	1916.	1917.	1918.	1919.	1920.
Premiums for year	$ 2,906,000	$ 3,313,000	$ 4,026,000	$ 4,766,713	$ 5,847,803
Net amount in force	87,983,000	95,309,000	112,978,000	141,549,458	171,649,628
Claims paid	1,034,000	1,302,000	1,538,000	1,850,673	1,459,503

TABLE XIV.—MISCELLANEOUS INSURANCE SUMMARY.

	1916.	1917.	1918.	1919.	1920.
Accident, P.	$126,000	$197,000	$221,000	$249,000	$349,000
" L.	47,000	111,000	78,000	113,000	154,000
Sickness, P.	100,000	50,000	73,000	106,000	115,000
" L.	43,000	21,000	41,000	65,000	52,000
Liability, P.	282,000	68,000	31,000	42,000	27,000
" L.	191,000	103,000	14,000	34,000	7,000
Automobile, P.	93,000	135,000	230,000	423,000	566,000
" L.	28,000	50,000	65,000	142,000	273,000
Marine, P.	200,000	283,000	404,000	472,000	438,000
" L.	120,000	152,000	125,000	210,000	253,000
Other forms, P.	69,000	74,000	79,000	134,000	164,000
" L.	28,000	22,000	21,000	35,000	86,000

P.—Premiums. L.—Losses.

RETURNS TO DECEMBER 31ST, 1920, OF PROVINCIAL LICENSEES OTHER THAN FIRE AND MARINE INSURANCE COMPANIES.

ASSETS.

Name of Company.	Real Estate.	Mortgages.	Bonds, Stocks, and Loans.	Interest accrued.	Outstanding Premiums and Agents' Balances.	Cash in Office or on Deposit.	All other Assets.	Total.
1. British Columbia Plate Glass Insurance Co	.....	.....	$ 17,128 18	$ 100 80	$ 4,200 00	$ 1,787 36	.....	$ 23,216 34
2. Great North Insurance Co	.....	$18,000 00	17,265 48	.....	35,235 67	15,823 70	$ 95,221 55	181,546 40
3. Royal Plate Glass Insurance Co	.....	2,250 00	7,060 73	54 76	1,868 89	218 89	1,347 21	12,800 48
4. Wawanesa Mutual Insurance Co	$16,763 91	.....	291,900 00	2,614 90	69,900 39	123,375 79	.....	504,554 99
5. Western Empire Life Assurance Co	15,319 60	71,362 63	281,140 55	12,451 73	61,363 30	15,115 13	191,719 12	648,471 46
Totals	$32,083 51	$91,612 03	$614,494 94	$15,222 19	$172,568 25	$156,320 87	$288,287 88	$1,370,589 67

LIABILITIES.

Name of Company.	Unpaid Losses.	Unearned Premiums.	Other Reserves.	Other Liabilities.	Total except Paid-up Capital.	Capital Stock paid-up.	Total including Paid-up Capital.
1. British Columbia Plate Glass Insurance Co	$ 910 14	$ 21,252 56	.....	.....	$ 22,162 70	$ 3,840 00	$ 26,002 70
2. Great North Insurance Co	10,000 00	37,330 00	.....	$55,526 85	102,856 85	112,810 00	215,666 85
3. Royal Plate Glass Insurance Co	628 76	4,490 77	.....	71 74	5,191 27	2,750 00	7,941 27
4. Wawanesa Mutual Insurance Co	.....	109,466 98	.....	.....	109,466 98	.....	109,466 98
5. Western Empire Life Assurance Co	3,402 68	340,627 00	.....	38,971 27	383,000 95	199,666 05	582,667 00
Totals	$14,941 58	$513,167 31	.....	$94,569 86	$622,678 75	$319,066 05	$941,744 80

RECEIPTS.

Name of Company.	Premiums.	Interest.	Calls on Capital Stock.	All other Receipts.	Total.
1. British Plate Glass Insurance Co	$ 28,116 64	$ 905 97	.....	$ 357 95	$ 29,380 56
2. Great North Insurance Co	128,636 31	1,282 25	$ 8,422 10	4,803 60	143,144 26
3. Royal Plate Glass Insurance Co	4,925 22	731 48	....	....	5,656 70
4. Wawanesa Mutual Insurance Co	316,564 80	14,670 94	.....	.....	331,235 74
5. Western Empire Life Assurance Co	130,759 48	27,530 36	45,970 85	11,484 48	215,745 17
Totals	$609,002 45	$45,121 00	$54,392 95	$16,646 03	$725,162 43

EXPENDITURES.

Name of Company.	Expenses of Management.	Losses Paid.	Dividends.	All other Expenditure.	Total.
1. British Columbia Plate Glass Insurance Co	$ 11,119 29	$ 16,000 13	$ 960 00	$ 27 12	$ 28,106 54
2. Great North Insurance Co	45,725 48	59,591 09	.....	8,961 23	114,277 80
3. Royal Plate Glass Insurance Co	1,609 39	2,997 94	.....	.....	4,607 33
4. Wawanesa Mutual Insurance Co	120,693 41	128,162 50	.....	5,966 21	254,822 12
5. Western Empire Life Assurance Co	82,720 35	26,068 40	151 43	664 00	109,604 18
Totals	$261,867 92	$232,820 06	$1,111 43	$15,618 56	$511,417 97

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VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

ANNUAL REPORT

OF THE

MENTAL HOSPITALS

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

FISCAL YEAR ENDING MARCH 31ST

1921

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

In Memoriam

✠

LIEUT.-COL. CHAS. E. DOHERTY

MEDICAL SUPERINTENDENT

OF BRITISH COLUMBIA

MENTAL HOSPITALS

1905—1920

✠

DIED

AUGUST 14TH, 1920

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Medical Superintendent of the Mental Hospitals for the fiscal year ending March 31st, 1921.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office.

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OFFICERS AND STAFF, MENTAL HOSPITALS.

H. C. Steeves, B.A., M.D., C.M., *General Medical Superintendent.*

OFFICERS AT NEW WESTMINSTER.

Medical Staff:

T. W. McAllister, M.D., *Acting Assistant Medical Superintendent.*
G. C. Paine, M.D., C.M., *Assistant Physician.* Lucy Sheppard, *Analyst.*

Clerical Staff:

Gowan S. Macgowan, *Bursar.* Thos. H. Cambridge, *Receiving Clerk.*
F. Gillard, *Clinical Clerk and Stenographer.*
J. F. O'Reilly, *Steward.* Violet Stead, *Stenographer.*

Chaplains:

Rev. R. Lennie, Protestant. Rev. Father Beck, Roman Catholic.

Nursing Staff:

Miss M. Fillmore, *Matron and Supervisor of Nurses.* F. Spooner, *Chief Attendant.*

Tradesmen and Instructors:

R. T. Hall, *Carpenter.* J. McMillan, *Shoemaker.* Chas. Salter, *Painter.*
J. Booth, *Florist.* W. F. Johnston, *Engineer.* E. B. Jones, *Laundryman.*
W. F. Beggs, *Tailor.* H. Bailey, *Farmer.* H. Oliver, *Plumber.*

OFFICERS OF ESSONDALE AND COLONY FARM.

Medical Staff:

A. L. Crease, M.D., C.M., *Assistant Medical Superintendent and Pathologist.*
E. J. Ryan, M.D., C.M., *First Assistant Physician.* ———, *Second Assistant Physician.*

Clerical Staff:

Gowan S. Macgowan, *Bursar.* C. Fletcher, *Chief Clerk.* M. H. McCabe, *Book-keeper.*
John Pumphrey, *Steward.* Gladys Oakley, *Stenographer.*
F. J. Fish, *Clinical Clerk and Stenographer.* I. H. Wedge, *Clinical Stenographer.*

Chaplains:

Rev. A. B. Lane, Protestant. Rev. Father Pare, Roman Catholic.

Nursing Staff:

Gilbert Mathewson, *Chief Attendant.* M. Doyle, *Assistant Chief Attendant.*
M. Fillmore, *Matron and Supervisor of Nurses.*

Tradesmen and Instructors:

J. B. Foster, *Chief Cook.* J. L. Malcolm, *Chief Engineer.*
E. Fitzgerald, *Mason and Builder.* T. Mowbray, *Electrician.*
J. Young, *Acting-Painter.* J. Symington, *Plumber.*
H. Lonsdale, *Chief Carpenter.* W. G. Armour, *Baker.*
J. Hargie, *Laundryman.* W. J. Willows, *Barber.*
E. B. Stinchcombe, *Overseer of Grounds and Works.*

Colony Farm:

R. Gardner, *Acting Farm Superintendent.* T. Weeks, *Record Clerk.*
H. Dorling, *Herdsman.* S. Wickham, *Dairyman.*
J. Renton, *Gardens and Nurseries.*

OFFICERS OF MENTAL HOME, COLQUITZ.

George Hall, M.D., C.M., *Visiting Physician.*
Granby Farrant, *Managing Supervisor.* Harry Hoult, *Chief Attendant.*

Chas. E. Doherty, M.D., C.M.

REPORT OF THE MEDICAL SUPERINTENDENT

For the Twelve Months Ending March 31st, 1921.

PART I.—MEDICAL.

NEW WESTMINSTER, B.C., March 31st, 1921.

The Honourable the Provincial Secretary,
Parliament Buildings, Victoria, B.C.

SIR,—I have the honour to submit for your consideration the Forty-ninth Annual Report of British Columbia Mental Hospitals, covering the fiscal year April 1st, 1920, to March 31st, 1921, showing statistical detail of the operations in all departments.

The year has witnessed the loss of our esteemed Medical Superintendent, Dr. C. E. Doherty, who was called by death on August 14th, 1920, after an illness of only a few months. Those of us who were associated with him felt keenly his loss and fully realized that the Mental Hospitals of our Province lost heavily by his untimely death. The energy and organizing ability of Dr. Doherty as well as his genial personality made him a most admirable man for his position, as was so clearly demonstrated by his long and eminently successful administration of the Hospitals, in which they were brought to a very high standard of efficiency. His name will be ever associated with the history of progress in the care of our insane and will ever be revered by the many who have received health from his care, as well as those who had the pleasure of being associated with him in his work.

The admissions to Hospitals during the year have continued heavy, totalling 489, 339 of whom were males and 150 females. We were, however, able to discharge during the same period 301 males and 176 females, a total of 477, leaving the unusually small net increase of population in Hospitals of only 12 patients.

During the year a grand total of 2,043 patients have received care and treatment, with what success I feel our proportion of discharges speaks very clearly. The cost of caring for this great number of patients is set out in detail in the financial reports, and works out to the very small net cost of 93⅛ cents per patient per day, a figure which appears to me very satisfactory indeed.

A very striking fact is revealed by examination of Table No. 7, which shows that only 159 of the 489 patients admitted during the year were born in Canada. Such striking facts should be of great assistance to the immigration authorities in procuring the more diligent and effective examination of those who seek entry into our country, for it clearly shows that, although our population may show a gratifying increase, there is much room for improvement in the health of those admitted to our country and a great opportunity to afford relief to our taxpayers.

The types of mental disease present in those admitted is shown in Table No. 16, and follows closely and in about the same proportions as in former years. The essentially hereditary types as most clearly exemplified in the dementia præcox and manic depressive psychoses constitute over 50 per cent. of all the admissions, which include drug addicts, and should cause very serious consideration of this phase of mental illness. Should not more stress be laid on the important point of heredity as it affects our race and its future, and an educational campaign along these lines be instituted?

It appears to me that much good could be accomplished if our people more generally knew and understood these facts.

The large number (60) classed as toxic insane is due to the drug addicts treated during the year who were classified in this group. The experience gained during the year has clearly shown the futility of a few months' treatment for the drug addict, and we have come to believe firmly that if any permanent results are to be obtained in this class of case they must be cared for in a separate institution for a period of at least three years. The room at our disposal for the care and treatment of the insane has made it imperative that we discontinue receiving any other class of patient, and for that reason drug addicts are no longer received at the Mental Hospitals.

Thirty-four of the idiot and imbecile type have been admitted and many inquiries for the admission of this type have been received, but as the building devoted to this class of patient is already overcrowded we are unable to receive more of this class. It seems urgently necessary to provide additional accommodation for the care of this unfortunate class of patient, for, although a cure is not possible, a very great deal is accomplished in improving these cases by the intelligent care and treatment we are able to give them.

The patients have been especially free from any outbreak of infectious or contagious disease and did not suffer from influenza as in the preceding two years. The total deaths, 122, being only 5.97 per cent. of the number under treatment during the year.

Examination of Tables 19 shows clearly the wisdom of bringing mental cases to the Hospital as early as possible. These tables show that cases in which illness was present only a short time shows the highest number of discharges, and in this respect statistics fully bear out our experience. A case of mental illness in which delusions are unsystematized, hallucinations partially recognized, and insight not entirely gone affords a much better opportunity for treatment successfully than the case which has been allowed to go on untreated until the avenues of access to the patient's mind are completely blocked by disease before coming to Hospital. The tendency to recognize this fact is gradually growing among the medical profession and the public generally, but there is still much room to improve in this respect and so increase the patient's opportunities to regain health and return to a happy and useful place in the community.

DENTAL SERVICE.

The patients have continued to receive dental attention from the visiting dentist. This serves to care for the acute and urgent cases, but the time allotted only permits of very limited attention to prophylactic work, which is a very important feature indeed among a population many of whom have not been accustomed to more than cursory care of the mouth before mental illness attacked them. It is important indeed that our patients should have clean hands, faces, and bodies, but is it not even more important that they should have clean healthy mouths to prevent the entry of decayed and poisonous matter into the system with the food, and also to eliminate one of the most common sources of focal infection from which so many serious bodily ills arise? I do not suggest that the elimination of unhealthy mouths will cure mental disease, but it will certainly do much to improve physical health and by so doing greatly supplement mental improvement. I feel, therefore, that our dental service should be extended very materially, and that the time is rapidly approaching for the appointment of a resident dentist who will devote his entire time to the dental needs of our ever-increasing population.

LABORATORY.

An examination of the Laboratory Report by Dr. Crease, our Pathologist, reveals interesting statistics. A Wassermann test has been done as a routine on all cases admitted, and shows us that 45, or 8 per cent., of the admissions are syphilitic. Of this number, 30 suffered from general paresis, a mental disease due only to syphilis, and preventable had the syphilis been treated in its earlier stages, but absolutely fatal once general paresis has developed. Here alone is ample justification for the "Venereal Diseases Suppression Act" now being administered by our Public Health Service, and should for both humanitarian and economic reasons receive the whole-hearted support and assistance of all public organizations. The syphilitic cases have all received intensive anti-syphilitic treatment, but, unfortunately, no treatment has proven of benefit in staying the progress of the disease in those suffering from paresis.

The Laboratory has proven of inestimable value to the physicians in investigating the patient's condition and clearing up possible etiological factors in the cases under investigation. We hope to increase its sphere of usefulness and eventually to undertake definite lines of research in this department which will not only offer hope of new lines of treatment being developed, but also knowledge gained which will be applicable to prophylaxis in mental diseases.

BUILDING OPERATIONS.

The Nurses' Home at the Public Hospital for Insane has been completed and is now occupied. The building is proving very satisfactory indeed, and I feel that Mr. Whittaker, Public Works Architect, and Mr. Hall, the supervising carpenter and builder, are to be complimented on the building erected.

The sidewalk to the main entrance has been replaced with a modern cement walk and is a great improvement to the appearance of the entrance, as well as a comfort to those coming to the building.

At Essondale five cottages for employees have been completed and are very comfortable indeed. It is to be hoped that this unit can be gone forward with steadily, as living conditions for the married employees are at present far from satisfactory.

The crowded condition of the Hospitals made it necessary to seek additional dormitory space, and it was decided to add to the temporary building known as "The Farm Annex." Two large dormitories accommodating seventy-five beds were added to this building during the year, but even this has only slightly relieved the congested state of our general wards.

A workshop building 26 by 80 feet, one and a half stories, was erected for the use of various mechanical departments and has afforded very satisfactory relief from the former difficult working conditions.

A wagon-shed 20 by 102 feet was erected at Colony Farm and has been in use the greater part of the year. This has given relief to the machinery-barns and fills a much-needed requirement.

A great deal of time has been given by Mr. Fitzgerald and Mr. Lonsdale, as well as other members of our mechanical staff, to construction-work in connection with the Subnormal Boys' School. A very great amount of work has been accomplished during the year and the buildings are now within a few months of being ready for occupation. Much work, however, still remains to be done before the grounds are graded and in shape to compare favourably with the buildings erected.

In addition to new structures erected, a great volume of work in maintenance, repairs, and renewals has been done and every effort has been made to keep the plant in good repair at all times. This item is a very considerable one indeed at the Public Hospital for Insane, where the buildings are old and constantly in need of extensive repairs to keep them in suitable working-order.

Financial Operations.

The financial operations are set out in detail in the appended Bursar's report and in the report of Colony Farm operations. The various tables and balance-sheets show in minute detail all transactions in every branch of the institutions, as well as a record of produce and manufactured articles for which various departments have been credited at current market values. A study of these tables will show more clearly than words can describe the extensive work carried on at the Hospitals and will give a clear insight into the magnitude of our task.

All accounts owing the Hospitals have been closely followed and collections made as fully as possible. Maintenance accounts and the care of estates have been carefully followed and every effort made to obtain justice for the Hospital, at the same time not placing unnecessary hardships upon families whose dependents are in Hospital. The sum of $88,322.67 was collected on account of maintenance alone and paid into the Provincial Treasury during the year. Other collections from the sale of stock and produce have also been made as promptly as possible and remitted to the Treasury. I feel that the financial operations at the Hospitals are in a very satisfactory state, and much credit is due to the Bursar, Mr. Macgowan, and his staff for the thorough business methods carried out in this department.

Colony Farm.

Colony Farm suffered a serious loss in the resignation of Mr. P. Moore, the Superintendent, in August, 1920. Mr. Moore was a thoroughly practical farmer as well as a thoroughly trained man in the technical branches, and all those connected with the farm were extremely sorry to learn of his determination to leave us and enter into private farming. He carried with him the very best wishes of all his associates for success.

Mr. Robert Gardner, the assistant, took over the position as Acting-Superintendent and has carried on the work in a most efficient manner.

The conditions at Colony Farm during the year have been steadily improving. More land has been cleared and brought under cultivation. The health of the dairy herd has steadily improved and the number of young stock shown satisfactory increase. The herd is now producing the full milk requirements of the institutions, which amounts to an average of 2,000 lb. a day.

and is an asset of inestimable value to the patients, as it affords an ample supply of pure, fresh milk of a very high standard of cleanliness and average richness and affords an article of diet which would be quite impossible for the institutions to do without. Many of the acutely ill as well as the aged and infirm must depend almost entirely on milk for food, and it would be a great hardship were we unable to provide this wholesome food for them.

Although the autumn was an unusually bad one for harvest, we were fortunate in harvesting our entire crop. The grain-crop was good and the root-crop the largest ever harvested on Colony Farm.

I wish here to express my appreciation of the services of the Acting Farm Superintendent and his departmental heads, and to especially commend their loyalty in the face of many difficult situations which arose from time to time in carrying on the extensive work at the farm.

RECOMMENDATIONS.

As the Mental Hospitals of the Province grow from year to year new needs arise to meet the requirements and rearrangements of the organization become necessary to meet changing conditions. Our Hospital has now grown to be one of the largest in Canada, and in order to meet the requirements of this growth, and meet it efficiently, it has become necessary to organize into definite departments. It is proposed to continue this in future, and it is now recommended that a complete X-ray equipment be installed and organized with the Laboratories. It is also recommended that the Laboratories, together with the X-ray, be made into a distinct department, with a medical director who is a trained pathologist in charge, aided by a sufficient number of technicians to carry out extensive laboratory examinations of clinical and post-mortem materials, and to undertake definite lines of research, hoping to improve our service to our patients, and, by promoting recovery, benefit both the patients and the Hospital.

The most pressing need—in fact, an imperative need—is the construction of the permanent building for the acute insane at Essondale. The present buildings are at the very least one-third overcrowded, and it is only through the goodness of a kind Providence that we have not been attacked by a serious epidemic. The work of caring for the insane under the most favourable conditions is difficult indeed, but when conditions are unfavourable it becomes infinitely more so. If we are to keep up our standards of care we must keep up our equipment and facilities for treatment, and I most earnestly hope that every effort will be made to provide this most pressing need of the Hospitals.

It has long been recognized that the most potent therapeutic agent in treating mental disease is properly directed and systematized occupation. This idea has been carried out in our Hospitals, but the time has come when it should be extended, and it is recommended that a suitable building for industrial therapy be erected to take care of our growing needs in this direction.

As mentioned in another part of my report, it is most desirable that the policy of providing suitable living quarters for married employees at Essondale be carried forward each year, and I sincerely trust this may receive your approval and support.

ACKNOWLEDGMENTS.

I wish to officially record my appreciation of the services rendered our soldier patients by the Visiting Committee of the Red Cross Associations of both Vancouver and New Westminster, as well as the ladies' organizations from the surrounding municipalities. They have all been most diligent in their self-appointed duties and much help and happiness has been given our patients.

Mr. Estabrooks, of the Y.M.C.A., has also been a tireless worker in the same cause and has organized many entertainments which have been greatly enjoyed by the patients and helpful to them.

I wish especially to record my thanks to Dr. A. L. Crease, the Assistant Medical Superintendent at Essondale, for his loyalty to the Hospital, his valuable advice and ready co-operation and assistance; to Dr. Ryan, Assistant Physician, and Dr. McAllister, Assistant Physician, my grateful acknowledgment of duties well and cheerfully done; all officers and departmental heads are to be highly commended for loyal service, and I take this opportunity of expressing my thanks to them for valuable advice and assistance cheerfully given whenever occasion arose.

Driveway to Hospital, New Westminster.

In closing my report, I would indeed be ungrateful were I not to make acknowledgment of your sterling support during the year. I assure you it has been worth much to know that I could at all times depend upon you for a fair and impartial decision in all matters and a hearty support of all just needs of our Hospitals.

I have the honour to be,
Sir,
Your obedient servant,
H. C. STEEVES,
Medical Superintendent.

LABORATORY REPORT.

LABORATORY OF PROVINCIAL MENTAL HOSPITAL,
ESSONDALE, April 1st, 1921.

Dr. H. C. Steeves,
Medical Superintendent, Public Hospital for Insane,
New Westminster, B.C.

SIR,—I have the honour to submit herewith itemized report of work done in Laboratory during the year ended March 31st, 1921; the report is in this form for purposes of comparison with work done during the previous year.

There were the same number of Wassermann tests done in the twelve months just ended as were done during the fifteen months covered by the previous report. Of a total of 562 syphilitic tests, some 45, or 8 per cent., have shown a positive reaction. This is a slight reduction from last year, the proportion then being 10 per cent.

It is sometimes found that, while the blood will show a negative reaction, the spinal fluid will give a positive reaction; Wassermann spinal-fluid tests have therefore been effected on 66 patients who showed signs of luetic involvement.

In addition to the ordinary reactions, the Lang-Colloidal test is being carried out and is proving itself to be of valuable aid in conjunction with the others in the diagnosis of nervous and mental conditions, but as yet this has not been reported in detail.

What physiological chemistry has been done on the blood, etc., is proving of great help in the treatment of some of the medical cases, both of patients and staff.

The milk-counts have continued uniformly along the low level attained during the past few years.

The complement-fixation and agglutination tests for *Bacillus abortus* have been further carried out, and have shown that, even though the reaction for the *Bacillus abortus* may discontinue, yet the secondary infection can still continue to cause the loss of calves. Tests for these two have been done, and now that this information has been gained they are only being applied to the younger cases. Now that the tests have been done on the older herd it will not be necessary to repeat these, but it is essential that the younger ones have the test performed. It is greatly to be desired that future young herds be negative, thereby lessening the amount of treatment required in the future.

LABORATORY-WORK DONE, MARCH 31ST, 1920, TO MARCH 31ST, 1921.

Urinalyses—	
Routine	604
Quantitative sugar	9
Urea	1
Blood—	
Wassermann test for syphilis	562
Blood-counts—	
Complete	18
White and differential counts	12

Spinal fluids—	
Wassermann tests	66
Globulin	59
Cell-counts	58
Bacteria	3
Cultures—	
Throat	409
Blood	2
Sputa examinations for T.B.	22
Examination of fæces	2
Smears—	
Urethral for Gc	6
Abscess	1
Skin	1
Mouth	2
Pus	2
Vidal's reaction for typhoid	4
Bacterial counts on milk	21
Blood—	
Complement-fixation test for *Bacillus abortus*	364
Agglutination test for *B. abortus*	362

I have, etc.,

A. L. CREASE, M.D., C.M.,

Assistant Medical Superintendent and Pathologist.

DENTAL REPORT.

PUBLIC HOSPITAL FOR THE INSANE,
NEW WESTMINSTER, B.C.

Medical Superintendent,
Public Hospital for the Insane,
New Westminster, B.C.

SIR.—I beg to report the following dental work on patients in the Mental Hospitals, New Westminster and Essondale, during the year from April 1st, 1920, to March 31st, 1921, inclusive:—

Extractions	1,279
Amalgam fillings	73
Cement fillings	11
Porcelain fillings	22
Scaling and cleaning	181
Pyorrhœa treatments	16
Resetting gold crowns	1
Dentures	17
Adjusting dentures	5
Repairing dentures	14
Repairing bridge	1
Resetting bridge	1
Fractures treated	1
Abscesses treated	5

I have, etc.,

F. P. SMITH, D.D.S.,

Visiting Dentist.

STATISTICAL TABLES.

TABLE No. 1.

Showing the Operations of the Hospitals, New Westminster, Essondale, and Saanich, from April 1st, 1920, to March 31st, 1921.

Movement of Population.	Male.	Female.	Total.	TOTAL Male.	TOTAL Female.	TOTAL Total.
In residence, New Westminster, March 31st, 1920	166	397	563			
" Essondale, March 31st, 1920	768	28	796			
" Saanich, March 31st, 1920	99	..	99			
On probation, carried forward from 1919-20, New Westminster	14	42	56			
" " " Essondale	31	2	33			
" " " Saanich	..	..	..			
Escaped, carried forward from 1919-20, New Westminster	3	1	4			
" " Essondale	3	..	3			
" " Saanich	..	..	..			
				1,084	470	1,554
Admitted during the year 1920-21—						
By ordinary forms	309	149	458			
By urgency forms	13	1	14			
By voluntary	11	..	11			
From the Yukon	2	..	2			
Order in Council	4	..	4			
				339	150	489
Total under treatment, New Westminster, Essondale, and Saanich, April 1st, 1920, to March 31st, 1921	..	..	..	1,423	620	2,043
Discharged during period April 1st, 1920, to March 31st, 1921:						
(*a.*) From New Westminster—						
As recovered	14	38	52			
As improved	18	37	55			
As unimproved	12	12	24			
Not insane	..	1	1			
On probation and still out	10	40	50			
Escaped, but not discharged	..	..	..			
Died	32	43	75			
	86	171	257			
(*b.*) From Essondale—						
As recovered	35	1	36			
As improved	60	..	60			
As unimproved	31	1	32			
On probation and still out	32	1	33			
Escaped, but not discharged	7	..	7			
Died	45	2	47			
	210	5	215			
(*c.*) From Saanich—						
As improved	2	..	2			
On probation and still out	3	..	3			
	5	..	5			
Total discharged from New Westminster, Essondale, and Saanich	..	..	..	301	176	477
Total in residence, New Westminster, Essondale, and Saanich	..	..	..	1,122	444	1,566
New Westminster—						
Total on books, March 31st, 1920	183	440	623			
Admissions during 1920-21	339	150	489			
Returned from Essondale	38	2	40			
Returned from Saanich	1	..	1			
				561	592	1,153
Discharged during 1920-21	86	171	257			
Transferred to Essondale	289	11	300			
Transferred to Saanich	18	..	18			
				393	182	575
Total in residence, New Westminster, March 31st, 1921	..	..	..	168	410	578

TABLE No. 1—*Continued.*

Movement of Population.	Male.	Female.	Total.	TOTAL		
				Male.	Female.	Total.
Essondale—						
Total on books, March 31st, 1920	802	30	832			
Transferred from New Westminster	289	11	300			
				1,091	41	1,132
Discharged during the year 1920-21	210	5	215			
Returned to New Westminster	38	2	40			
Transferred to Saanich	3	..	3			
				251	7	258
Total in residence, Essondale, March 31st, 1921	..	..	..	840	34	874
Saanich—						
Total on books, March 31st, 1920	99	..	99			
Transferred from New Westminster	18	..	18			
Transferred from Essondale	3	..	3			
				120	..	120
Discharged during the year 1920-21	5	..	5			
Returned to New Westminster	1	..	1			
Returned to Essondale	..	..	..			
				6	..	6
Total in residence, Saanich, March 31st, 1921	..	..	..	114	..	114
Total in residence, New Westminster, March 31st, 1921	166	410	576			
Total in residence, Essondale, March 31st, 1921	840	34	874			
Total in residence, Saanich, March 31st, 1921	114		114			
Grand total in residence, New Westminster, Essondale, and Saanich, March 31st, 1921	..	..	..	1,120	444	1,564

Daily average population	1,540.25
Maximum number present any one day	1,564.00
Minimum number present any one day	1,522.00
Percentage of discharges on admissions (not including deaths)	72.69
" deaths on admissions	14.17
" deaths on those number under treatment	5.97

TABLE No. 2.

Showing in Summary Form the Operations of the Hospital since its Inception.

Year.	Admissions.	Discharges.		Deaths.	Number Resident at the Close of each Year.	Increase.	Decrease.	Whole Number treated.	Percentage of Recoveries to Admissions.	Percentage of Discharges to Admissions (Deaths excluded).	Percentage of Deaths to Whole Number under Treatment.
		Recovered.	Not recovered.								
1872	18	1	..	1	16	..	..	18	5.55	5.55	5.55
1873	15	10	2	5	14	..	2	31	66.66	80.00	16.12
1874	12	4	..	3	19	5	..	26	33.33	33.33	11.53
1875	29	3	3	10	32	13	..	48	10.34	26.89	20.83
1876	22	11	3	5	35	3	..	54	50.00	63.63	9.35
1877	14	4	4	3	38	3	..	49	28.57	78.57	6.12
1878	16	7	3	8	36	..	2	54	43.75	62.50	16.16
1879	18	4	1	8	41	5	..	54	22.22	27.77	14.81
1880	17	5	..	5	48	7	..	58	29.41	29.41	8.62
1881	13	5	3	5	48	..	..	61	38.46	61.54	8.19
1882	7	3	1	2	49	1	..	55	42.85	57.14	3.63
1883	8	4	1	3	49	..	..	57	50.00	62.50	5.26
1884	10	2	4	2	51	2	..	59	20.00	60.00	3.33
1885	20	5	..	5	61	10	..	71	25.00	25.00	6.94
1886	27	10	6	6	66	5	..	88	37.03	59.25	6.81
1887	36	15	5	5	77	11	..	102	41.66	55.55	4.80
1888	26	12	6	3	82	5	..	103	46.15	69.23	2.87
1889	41	14	5	4	100	18	..	123	34.15	46.34	3.25
1890	52	17	6	12	117	17	..	152	32.69	44.23	7.64
1891	49	19	4	20	123	6	..	166	38.77	46.94	11.69
1892	52	17	10	13	135	12	..	175	32.69	51.92	6.95
1893	44	14	18	14	133	..	2	179	31.81	72.72	7.60
1894	80	13	19	19	162	29	..	213	16.25	40.00	8.92
1895	62	29	11	20	164	2	..	224	46.77	64.51	8.92
1896	64	23	25	9	171	7	..	228	35.93	75.00	3.94
1897	74	20	8	14	203	32	..	246	27.03	37.83	5.69
1898	81	27	13	19	221	18	..	285	33.33	49.38	6.66
1899	101	31	32	21	234	13	..	327	30.69	62.37	6.42
1900	113	38	27	29	258	24	..	356	33.63	57.52	8.14
1901	115	40	20	25	284	26	..	377	34.78	52.17	6.63
1902	121	30	31	25	311	27	..	413	24.79	50.41	6.06
1903	139	38	37	26	349	38	..	466	27.34	53.96	5.57
1904	115	46	26	26	321	..	28	480	40.00	62.61	5.42
1905	123	43	33	27	348	27	..	505	33.33	61.78	5.34
1906	150	36*	43	28	388	43	..	552	23.03	52.06	5.04
1907	221	48	43	39	461	73	..	666	21.30	41.20	5.08
1908	230	68*	56	57	507	46	..	765	28.30	53.90	7.44
1909	232	73†	77	40	536	29	..	816	31.00	64.60	6.40
1910	280	84	82	41	595	48	..	896	30.00	59.28	4.57
1911	332	67‡	114	60	690	105	..	1,034	19.57	54.42	5.83
1912	375	74*	128	76	752	62	..	1,065	18.90	53.80	7.02
1913	380	90‖	146	67	919	167	..	1,264	22.63	62.10	5.30
1914	402	58	126	74	1,027	108	..	1,364	14.43	45.77	5.43
1915	332	83	91	89	1,090	63	..	1,437	25.00	52.41	6.19
1916	353	73†	96	80	1,205	115	..	1,527	20.68	47.87	5.24
1917	371	88	78	106	1,301	96	..	1,650	23.72	44.74	6.42
1918	375	75	95	132	1,347	46	..	1,753	20.00	45.33	7.47
Jan. 1, 1919, to Mar. 31, 1920	574	116	221	132	1,458	111	..	2,025	20.20	58.71	6.51
Apl. 1, 1920, to Mar. 31, 1921	489	88	173	122	1,566	108	..	2,043	14.17	72.60	5.97

* Three not insane. † One not insane. ‡ Two not insane ‖ Four not insane.

TABLE No. 3A.

Showing Number of Admissions, Discharges, and Deaths from April 1st, 1920, to March 31st, 1921, New Westminster.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1920.									
April	40	13	53	1	12	13	5	5	10
May	23	12	35	..	..	..	1	4	5
June	26	12	38	..	..	..	4	6	10
July	34	13	47	..	16	16	1	2	3
August	28	15	43	10	1	11	7	1	8
September	31	12	43	..	2	2	1	2	3
October	25	9	34	..	2	2	2	2	4
November	18	11	29	12	22	34	2	3	5
December	38	10	48	..	2	2	3	3	6
1921.									
January	27	13	40	13	3	16	3	4	7
February	26	16	42	..	14	14	1	5	6
March	23	14	37	8	14	22	2	6	8
Totals	339	150	489	44	88	132	32	43	75

TABLE No. 3B.

Showing Number of Admissions, Discharges, and Deaths from April 1st, 1920, to March 31st, 1921, Essondale.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1920.									
April	32	2	34	2	..	2	2	1	3
May	19	3	22	3	..	3	9	..	9
June	20	1	21	3	..	3	1	..	1
July	29	..	29	..	..	..	1	..	1
August	14	..	14	4	..	4	1	..	1
September	29	1	30	26	..	26	..	1	1
October	18	1	19	3	..	3	5	..	5
November	19	..	19	3	..	3	4	..	4
December	31	1	32	2	..	2	4	..	4
1921.									
January	25	1	26	42	2	44	3	..	3
February	26	..	26	1	..	1	6	..	6
March	27	1	28	37	..	37	9	..	9
Totals	289	11	300	126	2	128	45	2	47

TABLE No. 3c.

Showing Number of Admissions, Discharges, and Deaths from April 1st, 1920, to March 31st, 1921, Saanich.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1920.									
April	..	..	..	..	..	..	..	..	..
May	2	..	2	..	..	..	..	..	..
June	6	..	6	..	..	..	..	..	..
July	..	..	..	..	..	..	..	..	..
August	5	..	5	..	..	..	..	..	..
September	..	..	..	..	..	..	..	..	..
October	4	..	4	1	..	1	..	..	..
November	..	..	..	1	..	1	..	..	..
December	..	..	..	..	..	..	..	..	..
1921.									
January	..	..	..	..	..	..	..	..	..
February	4	..	4	..	..	..	..	..	..
March	..	..	..	..	..	..	..	..	..
Totals	21	..	21	2	..	2	..	..	..

TABLE No. 4.

Showing Civil State of Patients admitted from April 1st, 1920, to March 31st, 1921.

Civil State.	Male.	Female.	Total.
Married	107	87	194
Single	214	43	257
Divorced	14	19	33
Widowed	3	1	4
Unknown	1	..	1
Totals	339	150	489

TABLE No. 5.

Showing Religious Denominations of Patients admitted from April 1st, 1920, to March 31st, 1921.

Religious Denomination.	Male.	Female.	Total.
Atheist	1	..	1
Buddhist	9	2	11
Christian Science	..	1	1
Confucian	22	..	22
Hebrew	1	..	1
Lutheran	32	4	36
Plymouth Brethren	2	..	2
Protestant	184	116	300
Roman Catholic	74	23	97
Seventh Day Adventist	2	1	3
Unknown	12	3	15
Totals	339	150	489

TABLE No. 6.

Showing the Degree of Education of those admitted from April 1st, 1920, to March 31st, 1921.

Degree of Education.	Male.	Female.	Total.
Excellent	..	3	3
Good	72	29	101
Common school	195	89	284
Poor	49	20	69
None	23	9	32
Unknown	..	..	..
Totals	339	150	489

TABLE No. 7.

Showing the Nationality of those admitted from April 1st, 1920, to March 31st, 1921.

Nationality.	Male.	Female.	Total.
Albania	..	1	1
Austria	2	..	2
Bavaria	1	..	1
Belgium	..	1	1
Bohemia	2	..	2
China	24	..	24
Denmark	4	..	4
England	67	46	113
Finland	8	1	9
Galicia	1	..	1
Germany	2	1	3
Hungary	1	1	2
Iceland	..	1	1
India	1	..	1
Ireland	11	5	16
Italy	5	2	7
Jamaica	1	..	1
Japan	8	2	10
Mexico	1	..	1
Montenegro	2	..	2
Newfoundland	2	2	4
New Zealand	..	1	1
Norway	6	1	7
Poland	4	..	4
Roumania	1	..	1
Russia	6	1	7
Scotland	18	11	29
Slavonia	1	..	1
South Africa	1	..	1
Sweden	18	4	22
Switzerland	1	..	1
Syria	..	1	1
United States	27	19	46
Unknown	1	..	1
Wales	1	1	2
Canada—			
Alberta	1	2	3
British Columbia	30	11	41
Manitoba	11	5	16
New Brunswick	3	4	7
Nova Scotia	8	2	10
Ontario	42	17	59
Prince Edward Island	3	..	3
Quebec	6	4	10
Saskatchewan	1	1	2
Canada (general)	6	2	8
Totals	339	150	489

Table No. 8.

Showing what Districts contributed Patients from April 1st, 1920, to March 31st, 1921.

Place of Residence at Time of Committal.	Male.	Female.	Total.	Place of Residence at Time of Committal.	Male.	Female.	Total.
				Brought forward	66	23	89
Agassiz	1	..	1	Menzie Bay	1	..	1
Alberta, Province of	1	..	1	Merritt	1	..	1
Aldergrove	1	2	3	Midway	..	1	1
Anyox	1	..	1	Milner	..	1	1
Ashcroft	1	..	1	Mission	1	1	2
Atlin	1	..	1	Mount Lehman	1	1	2
Bainbridge	1	..	1	Mount Tolmie	..	1	1
B.C. Penitentiary	2	..	2	Naramata	1	..	1
Britannia Beach	..	1	1	Nelson	1	2	3
Buckley Bay	1	..	1	New Westminster	12	12	24
Burnaby	5	..	5	North Arm	1	..	1
Caithness	..	1	1	North Bend	1	..	1
Campbell River	1	..	1	Oakalla Prison Farm	5	..	5
Cedar District, V.I.	1	..	1	Ocean Falls	5	..	5
Celista	.	1	1	Palling	..	1	1
Chase	..	1	1	Penticton	1	..	1
Chilliwack	2	..	2	Pitt Meadows	..	1	1
Coal Creek	1	..	1	Port Alberni	2	..	2
Collingwood	1	3	4	Port Haney	2	4	6
Cowichan Lake	..	1	1	Port Moody	1	..	1
Cranbrook	1	..	1	Powell River	1	..	1
Creston	1	..	1	Prince Rupert	3	..	3
Cumberland	2	..	2	Princeton	2	..	2
Dawson, Y.T.	2	..	2	Queensborough	1	..	1
Deroche	1	..	1	Quesnel	4	..	4
Edmonds	1	2	3	Revelstoke	1	..	1
Enderby	1	..	1	Royal Oak	1	..	1
Erickson	..	1	1	Saanich	2	2	4
Esquimalt	1	..	1	Salmon Arm	3	2	5
Falkland	1	..	1	Sandon	1	..	1
Fernie	3	3	6	Slocan City	..	1	1
Golden	4	..	4	Smithers	2	..	2
Grand Forks	..	1	1	Soda Creek	2	..	2
Greenwood	1	..	1	South Fort George	3	1	4
Hammond	2	1	3	South Pender Island	..	1	1
Hazelton	1	..	1	Squamish	2	..	2
Hope	1	..	1	Steveston	1	..	1
Jubilee	..	1	1	Swift Creek	1	..	1
Kamloops	9	..	9	Valgar Island	..	1	1
Kelowna	3	..	3	Vancouver	165	74	239
Keremeos	1	..	1	" North	4	3	7
Kingcombe River	1	..	1	" South	8	4	12
Koksilah	..	1	1	" West	1	..	1
Ladner	3	..	3	Vernon	2	..	2
Ladysmith	..	1	1	Victoria	24	10	34
Langley Prairie	..	1	1	Waldo	1	..	1
Landford	1	..	1	Wellington	1	1	2
Lund	1	1	2	White Rock	..	1	1
Lytton	1	..	1	Whonnock	..	1	1
Maillardville	1	..	1	150-Mile House	1	..	1
Masset	1	..	1				
Carried forward	66	23	89	Totals	339	150	489

TABLE No. 9.

Showing the Occupations of those admitted from April 1st, 1920, to March 31st, 1921.

Occupation.	Male.	Female.	Total.
Brought forward	233	111	344
Accountant	2	..	2
Auto-repairer	2	..	2
Baker	2	..	2
Bar-keeper	1	..	1
Bill-poster	1	..	1
Blacksmith	2	..	2
Boiler-maker	2	..	2
Book-keeper	1	..	1
Bricklayer	1	..	1
Broker	1	..	1
Cabinetmaker	2	..	2
Carpenter	8	..	8
Canvasser	1	..	1
Cement-worker	1	..	1
Chauffeur	2	..	2
Clerk	9	.	9
Commission agent	1	..	1
Conductor	1	..	1
Cook	10	2	12
Coppersmith	1	..	1
Dentist's assistant	..	1	1
Dressmaker	..	3	3
Engineer	2	..	2
Farmer	30	..	30
Fireman	4	..	4
Fisherman	6	..	6
Fitter	2	..	2
Foreman	1	..	1
Garage-helper	1	..	1
Gardener	1	..	1
Goldsmith	1	..	1
Governess	..	1	1
Grocer	1	..	1
Hardware merchant	1	..	1
Hospital orderly	1	..	1
Hotelkeeper	1	..	1
Housekeeper	..	20	20
Housewife	..	83	83
Interpreter	1	..	1
Journalist	2	..	2
Kitchen-help	1	..	1
Labourer	98	..	98
Lather	2	..	2
Logger	9	..	9
Longshoreman	3	..	3
Lumberman	6	..	6
Machinist	3	..	3
Manager	1	..	1
Masseuse	..	1	1
Mechanic	2	..	2
Messenger	2	..	2
Carried forward	233	111	344

Occupation.	Male.	Female.	Total.
Brought forward	233	111	344
Milliner	..	1	1
Millwright	1	..	1
Miner	13	..	13
Music-dealer	..	1	1
Musician	1	..	1
None	18	20	38
Nursemaid	..	1	1
Painter	2	.	2
Pedler	1	..	1
Plasterer	1	..	1
Plumber	1	..	1
Policeman	1	..	1
Porter	1	..	1
Prospector	1	..	1
Rancher	6	..	6
Retired	1	..	1
Rigger (marine)	1	..	1
Riveter	2	..	2
Road Superintendent	1	..	1
Sailor	6	..	6
Salesman	5	..	5
Saw-filer	1	..	1
Secretary	1	..	1
Seamstress	..	2	2
Servant	..	5	5
Shingle-maker	1	.	1
Shipwright	1	..	1
Social service	..	1	1
Soldier	2	..	2
Stenographer	..	1	1
Stone-cutter	1	..	1
Storekeeper	2	..	2
Student	7	2	9
Tailor	2	..	2
Tailoress	..	1	1
Teacher	1	2	3
Teamster	4	..	4
Tiemaker	1	..	1
Time-keeper	1	..	1
Tinsmith	1	..	1
Trainman	3	..	3
Trapper	3	..	3
Traveller	3	..	3
Truck-driver	1	..	1
Typist	1	..	1
Vulcanizer	1	..	1
Waiter	3	1	4
Warehouseman	1	..	1
Watchman	1	..	1
Weaver	..	1	1
Totals	339	150	489

TABLE No. 10.

Showing the Ages of those admitted from April 1st, 1920, to March 31st, 1921.

Age.	Male.	Female.	Total.
Under 15 years	14	5	19
From 15 to 20 years	16	6	22
" 20 to 25 "	28	13	41
" 25 to 30 "	42	16	58
" 30 to 35 "	43	22	65
" 35 to 40 "	48	18	66
" 40 to 45 "	39	18	57
" 45 to 50 "	32	16	48
" 50 to 55 "	27	7	34
" 55 to 60 "	12	11	23
" 60 to 65 "	15	7	22
" 65 to 70 "	7	6	13
" 70 to 75 "	6	3	9
" 75 to 80 "	5	2	7
Over 80 years	3	..	3
Unknown	2	..	2
Totals	339	150	489

TABLE No. 11.

Showing the Number of Attacks in those admitted from April 1st, 1920, to March 31st, 1921.

Number of Attacks.	Male.	Female.	Total.
First	255	108	363
Second	59	30	89
Third	11	8	19
Fourth	2	..	2
Several	5	1	6
Unknown	6	..	6
Not insane	1	3	4
Totals	339	150	489

TABLE No. 12.

Showing the Alleged Duration of Attacks prior to Admission.

Duration of Attack.	Male.	Female.	Total.
Under 1 week	49	25	74
From 1 week to 1 month	123	53	176
" 1 to 3 months	41	26	67
" 3 to 6 "	23	15	38
" 6 to 12 "	19	3	22
" 1 to 2 years	22	7	29
" 2 to 5 "	25	9	34
" 5 to 10 "	8	3	11
" 10 to 15 "	8	3	11
Over 15 years	6	3	9
Unknown	14	..	14
Not insane	1	3	4
Totals	339	150	489

TABLE No. 13.

Showing Statistics of Heredity in those admitted from April 1st, 1920, to March 31st, 1921.

Heredity.	Male.	Female.	Total.
Paternal and maternal branches	..	1	1
Paternal branch	12	3	15
Maternal branch	8	1	9
Heredity	60	21	81
Heredity, inferred	19	25	44
Unknown	239	96	335
Not insane	1	3	4
Totals	339	150	489

TABLE No. 14.

Showing the Alleged Cause of Attack in those admitted from April 1st, 1920, to March 31st, 1921.

Alleged Cause.	Male.	Female.	Total.
Alcohol	26	2	28
Arteriosclerosis	15	4	19
Congenital	14	..	14
Consanguinity	..	1	1
Constitutional	21	..	21
Drugs and allied toxemias	28	7	35
Epilepsy	4	5	9
Hæmorrhage	..	1	1
Heredity	60	21	81
Heredity, ascertained	20	5	25
Heredity, inferred	19	25	44
Influenza	1	..	1
Menopause	..	4	4
Nephritis	2	..	2
Not insane	1	3	4
Onanism	1	..	1
Puberty	..	2	2
Puerperal	..	7	7
Religion	..	1	1
Senility	6	2	8
Shock	..	6	6
Syphilis	30	5	35
Traumatic	3	2	5
Unknown	72	16	88
Worry	16	31	47
Totals	339	150	489

TABLE No. 15.

Showing the State of Bodily Health in those admitted from April 1st, 1920, to March 31st, 1921.

Bodily Condition.	Male.	Female.	Total.
In good health	41	60	101
In average bodily health	189	44	233
In reduced health	79	44	123
In greatly reduced health	30	2	32
Totals	339	150	489

TABLE No. 16.

Showing the Form of Mental Disorder in those admitted from April 1st, 1920, to March 31st, 1921.

Form of Disorder.	Male.	Female.	Total.
Acute mania	1	..	1
Cerebral lues	..	1	1
Dementia præcox	92	35	127
Epileptic insanity	9	6	15
General paresis	28	1	29
Hallucinosis	..	1	1
Hysterio mania	..	1	1
Idiocy and imbecility	24	10	34
Korsakow's psychosis	..	1	1
Mania, depressive	93	61	154
Melancholia	2	3	5
Not insane	1	3	4
Paranoia	10	11	21
Puerperal	..	2	2
Senile dementia	23	7	30
Terminal dementia	1	..	1
Toxic insanity	53	7	60
Traumatic insanity	2	..	2
Totals	339	150	489

TABLE No. 17A.

Showing the Number allowed out on Probation and Results from April 1st, 1920, to March 31st, 1921, New Westminster.

Results.	Male.	Female.	Total.
Discharged recovered	13	16	29
" improved	5	22	27
" unimproved	2	3	5
" not insane	..	1	1
Returned to Hospital	6	18	24
Still out at close of year	10	40	50
Totals	36	100	136

TABLE No. 17B.

Showing the Number allowed out on Probation and Results from April 1st, 1920, to March 31st, 1921, Essondale.

Results.	Male.	Female.	Total.
Discharged recovered	21	..	21
" improved	27	..	27
" unimproved	16	1	17
Returned to Hospital	17	1	18
Still out at close of year	32	1	33
Totals	113	3	116

TABLE No. 17c.

Showing the Number allowed out on Probation and Results from April 1st, 1920, to March 31st, 1921, Saanich.

Results.	Male.	Female.	Total.
Discharged recovered	..	..	..
" improved	2	..	2
" unimproved	..	..	..
" not insane	..	..	..
Returned to Hospital	..	..	..
Still out at close of year	3	..	3
Totals	5	..	5

TABLE No. 18A.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from New Westminster from April 1st, 1920, to March 31st, 1921.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	9	19	28
Less than 1 month	14	36	50
From 1 to 2 months	3	5	8
" 2 to 3 "	2	5	7
" 3 to 6 "	5	9	14
" 6 to 12 "	3	3	6
" 1 to 2 years	2	3	5
" 2 to 3 "	1	..	1
Over 3 years	..	4	4
Unknown	5	4	9
Totals	44	88	132

TABLE No. 18B.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from Essondale from April 1st, 1920, to March 31st, 1921.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	14	..	14
Less than 1 month	25	1	26
From 1 to 2 months	17	..	17
" 2 " 3 "	3	..	3
" 3 " 4 "	3	..	3
" 4 " 5 "	5	..	5
" 5 " 6 "	..	..	..
" 6 " 9 "	3	..	3
" 9 " 12 "	4	..	4
" 1 " 2 years	6	..	6
Over 2 years	9	1	10
Unknown	37	..	37
Totals	126	2	128

TABLE No. 18c.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from Saanich from April 1st, 1920, to March 31st, 1921.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 month	2	..	2
Totals	2	..	2

TABLE No. 19A.

Showing the Length of Residence of those discharged from New Westminster from April 1st, 1920, to March 31st, 1921.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.	Not Insane.
Under 1 month	4	6	5	1
From 1 to 2 months	12	7	2	..
" 2 " 3 "	8	7	5	..
" 3 " 4 "	6	4	..	..
" 4 " 5 "	4	6	1	..
" 5 " 6 "	7	2	1	..
" 6 " 9 "	4	5	4	..
" 9 " 12 "	6	7	2	..
" 1 " 2 years	1	7	1	..
" 2 " 3 "	..	..	1	..
" 3 " 4 "	..	3	1	..
" 4 " 5 "	..	..	1	..
" 5 " 6 "	..	..	..	..
Over 6 years	..	1	1	..
Totals	52	55	24	1

TABLE No. 19B.

Showing the Length of Residence of those discharged from Essondale from April 1st, 1920, to March 31st, 1921.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.
Under 1 month	4	3	2
From 1 to 2 months	7	10	7
" 2 " 3 "	6	7	2
" 3 " 4 "	3	7	4
" 4 " 5 "	3	8	1
" 5 " 6 "	1	3	..
" 6 " 9 "	6	5	3
" 9 " 12 "	4	4	2
" 1 " 2 years	1	2	4
" 2 " 3 "	1	5	2
" 3 " 4 "	..	..	..
" 4 " 5 "	..	3	1
" 5 " 6 "	..	..	1
" 6 " 7 "	..	2	1
Over 7 years	..	1	2
Totals	36	60	32

TABLE No. 19c.

Showing the Length of Residence of those discharged from Saanich from April 1st, 1920, to March 31st, 1921.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.
Less than 1 month	..	..	..
From 1 to 2 months	..	..	..
" 2 " 3 "	..	..	..
" 3 " 4 "	..	..	..
" 4 " 5 "	..	2	..
" 5 " 6 "	..	..	..
" 6 " 9 "	..	..	..
" 9 " 12 "	..	..	..
" 1 " 2 years	..	..	..
" 2 " 3 "	..	..	..
" 3 " 4 "	..	..	..
Totals	..	2	..

TABLE No. 20A.

Record of Deaths from April 1st, 1920, to March 31st, 1921, New Westminster.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
6045	J. E.	M.	73	..	7	1	Exhaustion of senile dementia.
6137	R. I.	F.	22	..	4	15	Cerebral hæmorrhage.
5621	T. G. C.	F.	44	1	6	13	Chronic intestinal nephritis.
6297	J. D.	M.	81	..	..	18	Pneumonia.
6283	C. LaR.	M.	70	..	1	7	Cerebral hæmorrhage.
6074	F.M.R.	F.	41	..	7	..	Pneumonia with pulmonary thrombosis.
6273	B. E. B.	M.	60	..	1	20	Exhaustion of senile dementia.
4672	L. R. C.	F.	50	4	2	25	Pulmonary tuberculosis.
6162	T. B. D. T.	M.	64	..	4	17	Hypostatic pneumonia.
6265	E. M. H.	F.	27	..	2	1	Status epilepticus.
6258	W. S. S.	M.	48	..	2	16	Exhaustion of general paresis.
6116	A. O.	F.	60	..	6	7	Acute celulitis.
6385	M. P.	F.	66	..	..	4	Exhaustion of mania.
1960	M. B.	F.	86	12	10	20	Acute enteritis.
5715	M. C. K.	F.	40	1	5	20	Pulmonary tuberculosis.
5237	J. M.	F.	57	2	10	26	Cerebral hæmorrhage.
6398	W. S. F.	M.	36	..	..	7	Pulmonary tuberculosis.
6389	J. L. D.	M.	38	..	..	14	Myocarditis.
6403	A. M. G.	F.	45	..	..	8	Exhaustion of acute mania.
6401	A. S.	M.	45	..	..	10	Exhaustion of acute mania.
5991	A. L. P.	F.	50	..	10	27	Arteriosclerosis with exhaustion of inanition.
5451	A. N. H.	F.	62	11	11	21	Myocarditis with broken compensation.
5555	M. B.	F.	43	1	11	6	Pulmonary tuberculosis.
5917	H. S.	F.	67	1	1	13	Exhaustion of senile dementia.
6139	J. U.	M.	62	..	7	7	Exhaustion of senile dementia.
6425	H. S.	F.	44	1	3	4	Cerebral hæmorrhage.
6353	C. C. D.	F.	43	..	2	13	Acute enteritis.
6482	E. U.	M.	28	..	..	4	Hæmorrhage following perforated duodinal ulcer.
2767	A. B.	M.	32	9	11	12	Exhaustion of epileptic insanity.
6396	J. M.	M.	27	..	2	14	Exhaustion of acute mania.
6494	E. B.	M.	40	..	..	2	Exhaustion from hæmorrhage of the mesentery.
6480	H. P.	M.	40	..	..	19	Exhaustion of acute mania.

TABLE No. 20A—*Continued.*

Record of Deaths from April 1st, 1920, to March 31st, 1921, New Westminster—*Continued.*

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
6504	F. R.	M.	40	.	..	9	Pulmonary tuberculosis.
5188	E. B.	F.	80	3	1	7	Exhaustion of senile dementia.
6502	C. P. B.	M.	42	..	..	15	Myocarditis and nephritis.
6358	J. S.	M.	47	..	4	7	Acute enteritis.
5254	E. B. G.	F.	71	2	11	11	Acute enteritis.
6446	W. H. P.	M.	67	..	2	6	Cerebral hæmorrhage.
6478	H. A. K.	F.	37	..	2	28	Exhaustion of depressive psychosis.
6531	D. McP.	M.	70	..	1	6	Hypostatic pneumonia.
6566	A. D.	M.	77	..	..	25	Exhaustion of senile dementia.
6461	C. E.	F.	48	..	3	6	Intestinal obstruction.
4559	M. A. D.	F.	73	5	1	13	Exhaustion of senile dementia.
6425	N. R. L.	F.	23	..	4	20	Exhaustion of inanition.
6516	H. J. W.	F.	57	..	3	7	Exhaustion of senile dementia.
5256	L. C.	M.	38	3	2	1	Pulmonary tuberculosis.
6569	S. F.	M.	60	..	2	..	Pulmonary tuberculosis.
2087	E. M. P.	F.	37	13	4	6	Pulmonary tuberculosis.
6503	J. W.	F.	80	..	3	24	Parenchymatous nephritis.
2328	A. B.	F.	48	11	10	..	Exhaustion of terminal dementia.
6499	A. F.	F.	40	..	4	4	Exhaustion of inanition.
6395	M. P.	M.	42	..	6	24	Exhaustion of general paresis.
6634	O. R.	M.	20	..	1	3	Collapse of acute mania.
6488	A. M.	M.	59	..	4	29	Exhaustian of senile dementia.
6678	G. S.	M.	40	..	..	9	Exhaustion of acute mania.
6573	M. T.	M.	49	..	3	8	Aortic aneurism rupture.
3271	C. M. P.	M.	48	8	8	..	Acute enteritis.
6574	S. J. K.	F.	85	..	3	12	Exhaustion of senile dementia.
6702	A. McN.	M.	83	..	..	18	Hypostatic pneumonia.
2774	L. C.	F.	49	10	2	21	Double lobar pneumonia.
4742	J. B.	M.	51	4	9	26	Uræmic poisoning and chronic nephritis.
6121	J. H.	F.	82	1	3	..	Cerebral hæmorrhage.
5074	A. W.	F.	64	3	10	12	Exhaustion of senile dementia.
6134	E. L. S.	F.	38	1	2	22	Streptococcic septicæmia.
6621	T. Y.	F.	18	..	2	27	Pulmonary tuberculosis.
6637	G. R.	M.	53	..	2	14	Exhaustion and inanition from arterio-sclerosis.
6697	J. W. Q.	F.	28	..	1	16	Syphilis.
4610	R. L.	F.	57	5	3	21	Pulmonary tuberculosis.
180	J. L. M.	F.	84	36	7	22	Hypostatic pneumonia, Myocarditis.
6347	M. F.	F.	83	..	10	6	Hypostatic pneumonia.
2520	C. G.	M.	55	11	3	..	Hypostatic pneumonia.
5349	A. P.	F.	42	3	3	..	Exhaustion of manic depressive insanity.
3116	E. O.	F.	53	9	4	..	Septicæmia, acute parenchymatous nephritis.
5410	C. E.	F.	55	3	1	18	Pulmonary tuberculosis.
6498	J. T.	M.	85	..	7	20	Exhaustion of terminal dementia.

TABLE No. 20B.

Record of Deaths from April 1st, 1920, to March 31st, 1921, Essondale.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months	Days.	
1618	A. A.	M.	58	4	5	12	Chronic ulcerative tuberculosis, general.
6259	A. H.	F.	23	..	2	1	Influenza-pneumonia.
5962	E. D. B.	M.	60	..	9	26	Exhaustion of general paresis.
2772	G. A. McD.	M.	60	9	5	28	Pylo-nephritis, bronchopneumonia, fractured femur.
1386	J. A. C.	M.	87	16	11	17	Chronic myocarditis.
5840	R. W.	M.	74	1	1	10	Exhaustion of senile dementia.
6277	L. M. S.	M.	70	..	2	2	Bronchopneumonia, fractured left humerus
5874	J. B. F.	M.	63	1	..	20	Exhaustion of senile dementia.
2330	C. M. R.	M.	79	11	2	24	Pulmonary tuberculosis.
6089	M. H.	M.	36	..	7	15	Cerebral hæmorrhage.
6268	G. W. W.	M.	15	..	2	22	Pneumonia.
6190	M. H.	M.	42	..	4	26	Cerebral hæmorrhage.
6369	F. W. V.	M.	37	..	1	17	Cerebral hæmorrhage.
6012	F. F.	M.	70	..	10	25	Bronchopneumonia.
5884	N. E.	M.	70	1	3	13	Cerebral hæmorrhage.
6423	A. L. R.	F.	4	..	3	10	Pulmonary tuberculosis, bronchopneumonia.
6032	G. W. B.	M.	68	1	1	17	Cerebral hæmorrhage.
6011	S. S. J.	M.	74	1	2	9	Myocarditis.
5403	A. McC.	M.	64	2	8	17	Endocarditis.
6452	J. P.	M.	56	..	3	15	Cerebral hæmorrhage.
5749	W. G. T.	M.	41	1	9	15	Cerebral hæmorrhage.
5717	F. W.	M.	51	1	10	29	Exhaustion of general paresis.
5233	G. L. C.	M.	58	3	2	14	Exhaustion of general paresis.
4306	M. P.	M.	60	5	10	19	Exhaustion of senility.
5845	S. L.	M.	63	1	7	24	Myocarditis.
6545	J. T. C.	M.	67	..	2	19	Exhaustion of senility.
4030	E. F.	M.	55	6	7	23	Cerebral hæmorrhage.
6351	D. C. W.	M.	80	..	7	20	Exhaustion of senility.
6309	D. McG.	M.	53	..	9	..	Bronchopneumonia.
6431	W. G. D.	M.	40	..	6	8	Exhaustion of general paresis.
2206	H. C.	M.	75	12	6	9	Myocarditis.
5767	A. C. P. C.	M.	42	1	11	24	Exhaustion of general paresis.
6336	G. E. B.	M.	49	..	9	16	Exhaustion of general paresis.
1565	H. H.	M.	67	16	3	11	Bronchopneumonia.
6274	J. B.	M.	37	..	11	..	Exhaustion of general paresis.
6419	A. W.	M.	30	..	7	26	Exhaustion of manic depressive.
5239	R. J.	M.	81	3	5	4	Exhaustion of senile dementia.
6368	Y. W.	M.	37	..	9	23	Pulmonary tuberculosis.
6666	A. L.	M.	49	..	2	9	Exhaustion of general paresis.
5592	P. L. F.	M.	36	2	6	21	Pernicious anæmia.
5915	J. R.	M.	25	1	9	17	Pulmonary tuberculosis.
6694	J. P.	M.	59	..	2	6	Syphilitic aortitis.
748	F. H.	M.	70	23	10	24	Diabetes mellitus.
6380	E. G.	M.	39	..	10	5	Exhaustion of general paresis.
2551	A. P. McK.	M.	68	11	2	6	Myocarditis.
2971	J. C.	M.	61	9	8	20	Myocarditis.
6314	C. R. E.	M.	32	..	11	28	Cerebral hæmorrhage.

TABLE No. 20C.

Record of Deaths from April 1st, 1920, to March 31st, 1921, Mental Home, Saanich—*Nil.*

Dormitory, New Mental Hospital, Essondale.

PART II.—FINANCIAL.

BURSAR'S REPORT.

PROVINCIAL MENTAL HOSPITAL,
ESSONDALE, B.C., March 31st, 1921.

Medical Superintendent, Provincial Mental Hospitals,
New Westminster, B.C.

SIR,—I beg to present to you herewith balance-sheets, Profit and Loss Accounts, together with various other financial statements, covering the fiscal period from April 1st, 1920, to March 31st, 1921.

The entire past year has been characterized by exceedingly high prices; all contracts being 20 per cent. higher than in previous years, and everything purchased in the open market, even under competitive figures, proportionately greater than formerly; practically no relief being felt until the end of the year.

In reviewing the summary statements of all the institutions, you will note an increase in the *per capita* cost for maintenance of patients of 12 cents per day. This increase, to some extent, is due to the rise in price of various commodities, but principally to the heavy additional expense to which the institution has been subject in the building of the Boys' Industrial School at Coquitlam. The expenditure for clothing and boots for patients assisting in this work alone, and which became a charge against our operating account, amounted to some $10,000. The very closest attention, however, was paid during the year to the buying and distribution of commodities, and great praise is due to our steward and the cooks for their frugality in handling supplies in these very important departments.

From the market indications of lower prices in rubber, hide, sugar, cotton, manufacturing textiles, clothing, boots, shoes, field products, and meat (in certain forms), all of which mean lower contract prices, and with the completion and handing-over of the Boys' Institution, the prospects are indeed bright for a reduction in cost during the coming year.

The gross expenditure for the three Mental Hospitals—New Westminster, Essondale, and Saanich—totals $602,825.98, and the following collections were remitted to the Treasury:—

New Westminster Institution	$38,323 55
Essondale Institution	46,418 81
Saanich Institution	3,580 31
Total	$88,322 67

After deducting collections the net *per capita* charge to the Province for patients' maintenance amounted to 93⅛ cents per day, or $340.67 per year, and is a very moderate figure considering the price of commodities and wages during the past.

Regarding revenue, the closest attention was paid to collections and every effort made to co-operate with the office of the Inspector of Municipalities in locating and handling the estates of patients, and as a result our revenue remitted into the Treasury is a very substantial increase over the previous twelve-month period.

Under the various headings in operating expenditure for each Hospital there is practically no great fluctuation, with the exception of provisions and clothing, the former being due to advanced prices and the latter to heavy purchases, especially at Essondale for clothing gangs on public works.

The capital expenditure at New Westminster totalled $37,752.19 for the year for construction of Nurses' Home and the clearing and opening of the new institution cemetery. While at Essondale the sum of $28,454.46 was expended for employees' cottages, shop buildings, additional quarters, and grading of grounds. This compares with $26,884.07 expended the previous year.

Reductions were made at all three institutions under the heading of "Maintenance and Repairs." This is usually a heavy item, but your motto, "Immediate Repairs," has been carefully carried out, and anything actually required was obtained, so that all plants and buildings are in a high state of efficiency.

In conclusion, I wish to express to my assistants my appreciation of their loyal services, and to tender them my heartfelt thanks for the manner in which they carried out the extra duties added to this office, and, in addition, to yourself for your kindness and co-operation at all times.

I have, etc.,
G. S. MACGOWAN,
Bursar.

PUBLIC HOSPITAL FOR THE INSANE, NEW WESTMINSTER.

BALANCE-SHEET, MARCH 31ST, 1921.

Assets.

Land		$ 80,000 00
Cemetery		610 89
Buildings		477,706 30
Plant and equipment		14,713 18
Furniture and fixtures		17,900 00
Accounts receivable, Boys' Industrial School		252 00
Inventories—		
Provisions	$3,679 11	
Furniture and fixtures	3,015 20	
Maintenance and repairs	195 17	
Clothing	4,924 86	
Miscellaneous	235 23	
		12,049 57
Deficit (cost of operations, 1920–21)		193,677 21
		$796,909 15

Liabilities.

Government of British Columbia	$796,909 15

PROFIT AND LOSS, MARCH 31ST, 1921.

Salaries	$ 85,383 61	
Office expenses	2,006 14	
Travelling expenses	291 39	
Fuel, water, light, and power	22,520 67	
Maintenance and repairs	11,912 85	
Furniture and fixtures	10,421 97	
Provisions	69,711 30	
Clothing, etc.	9,668 82	
Medical and surgical	3,627 47	
Examinations and committals	7,689 08	
Incidentals and unforeseen	10,253 46	
Patient-labour		$ 1,486 00
Collections to Treasury		38,323 55
Net (cost of operations, 1920–21)		193,677 21
	$233,486 76	$233,486 76

MENTAL HOSPITAL, ESSONDALE.

BALANCE-SHEET, MARCH 31ST, 1921.

Assets.

Land		$ 110,433 84
Buildings		593,152 54
Furniture and fixtures		36,008 28
Plant and equipment		40,950 00
Inventories—		
Provisions	$2,335 50	
Clothing	6,798 55	
Furniture and fixtures	3,360 83	
Coal	795 20	
Maintenance and repairs	983 77	
		14,273 85
Due by Soldiers' Civil Re-establishment		10,288 62
Essondale School		114 00
Deficit (cost of operations, 1920–21)		272,410 54
		$1,077,631 67

Liabilities.

British Columbia Government	$1,077,631 67

PROFIT AND LOSS, MARCH 31ST, 1921.

Salaries	$110,370 33	
Office supplies	3,131 52	
Travelling expenses	1,167 54	
Fuel, water, light, and power	30,025 06	
Maintenance and repairs	18,258 58	
Furniture and fixtures	11,332 97	
Provisions	122,960 16	
Clothing	29,447 19	
Medical and surgical	2,533 64	
Examinations, committals, and transportation	232 90	
Incidentals and unforeseen	7,125 46	
Patient-labour	.....	$ 17,756 00
Collections to Treasury	.....	46,418 81
Net operating costs of year	.....	272,410 54
	$336,585 35	$336,585 35

MENTAL HOME, SAANICH.

BALANCE-SHEET, MARCH 31ST, 1921.

Assets.

Land		$ 12,100 00
Buildings		229,705 00
Furniture and fixtures		14,048 49
Implements and stock		1,436 30
Airing and recreation court		750 00
Inventories—		
Provisions	$305 81	
Clothing	596 14	
Drugs, etc.	25 00	
Furniture and fixtures	106 67	
		1,033 62
Deficit (cost of operating, 1920–21)		48,415 56
		$307,488 97

Liabilities.

Government of British Columbia	$307,488 97

PROFIT AND LOSS, MARCH 31ST, 1921.

Salaries	$ 16,726 99	
Office supplies	224 99	
Travelling expenses	193 75	
Fuel, water, light, and power	5,948 25	
Maintenance and repairs	3,290 09	
Furniture and fixtures	657 94	
Provisions	14,287 41	
Clothing	3,407 80	
Medical and surgical supplies	562 19	
Examinations, committals, etc.	15 30	
Incidentals and unforeseen	6,681 16	
Collections to Treasury		$ 3,580 31
Net cost of operations		48,415 56
	$ 51,995 87	$ 51,995 87

Greenhouse, New Westminster.

FINANCIAL TABLES.

Table A.

Showing the Average Number of Patients in Residence each Year, the Total Amounts spent for Maintenance, and the Gross *per Capita* Cost.

Year.	Average Number in Residence.	Maintenance Expenditure.	*Per Capita* Cost.
1872 (81 days)	16.57	$ 2,265 25	$616 00
1873	16.07	7,841 94	487 98
1874	16.76	8,232 41	491 20
1875	27.42	9,892 38	360 77
1876	36.41	12,558 18	344 91
1877	34.61	12,917 17	373 26
1878	36.52	13,985 05	382 93
1879	38.17	10,253 72	268 63
1880	45.42	10,552 18	232 32
1881	47.18	10,691 76	226 62
1882	47.86	11,343 65	237 02
1883	48.73	11,829 11	242 75
1884	48.70	11,843 94	243 20
1885	54.67	15,555 87	284 54
1886	59.11	15,334 43	259 42
1887	73.55	15,945 22	216 70
1888	79.43	16,261 06	204 72
1889	71.30	15,657 79	219 60
1890	78.78	17,577 80	223 13
1891	119.87	21,757 03	181 50
1892	125.24	23,518 37	187 80
1893	133 92	25,904 98	193 36
1894	148.64	26,495 83	178 25
1895	162.97	31,587 89	193 83
1896	171.43	32,001 40	186 67
1897	188.91	36,224 76	191 75
1898	216.53	46,420 25	214 38
1899	226.44	54,917 45	242 52
1900	243.24	59,349 20	244 00
1901	269.56	55,406 08	205 54
1902	296.62	55,345 65	186 59
1903	332.23	59,353 57	178 65
1904	351.55	66,052 76	187 89
1905	340.90	63,342 07	185 80
1906	374.57	66,596 69	177 79
1907	419.24	74,874 64	178 59
1908	490.80	90,269 49	183 92
1909	526.85	96,586 32	183 32
1910	563.33	103,900 44	184 43
1911	641.02	126,782 50	197 78
1912	736.72	130,924 06	177 71
1913, M.H., New Westminster	550.54	119,663 71	217 36
1913, M.H., Essondale (9 months)	384.07	71,079 84	184 76
1914, M H., New Westminster	487.24	125,981 45	258 56
1914, M.H., Essondale	489.07	131,420 44	268 36
1915, M.H., New Westminster	515.74	123,021 70	238 53
1915, M.H., Essondale	560.56	123,878 43	220 99
1916, M.H., New Westminster	524.17	116,052 21	221 40
1916, M.H., Essondale	633.13	155,698 37	245 91
1917, M.H., New Westminster	535.66	124,124 68	231 72
1917, M.H., Essondale	716.35	166,231 51	232 05
1918, M.H., New Westminster	585 38	156,574 85	267 47
1918, M.H., Essondale	752.78	222,097 37	295 03
1919-20, M.H., New Westminster (15 months)	562.12	236,631 90	420 97
1919-20, M.H., Essondale (15 months)	755.46	357,630 99	473 38
1919-20, M.H., Saanich (373 days)	90.51	40,433 28	446 72
1920-21, M.H., New Westminster	567.47	233,486 76	411 44
1920-21, M.H., Essondale	834.10	336,585 35	403 52
1920-21, M.H., Saanich	108.67	51,995 87	478 47

TABLE B.

Showing Analysis of the *Per Capita* Cost.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture.	Medicines.	Miscellaneous.	Total.
1872.....	$279 38	$184 03	$55 81	$22 44	$15 55	$10 18	$49 30	$616 69
1873.....	221 48	166 81	14 55	23 65	21 59	7 74	32 16	487 98
1874.....	231 10	152 10	22 07	23 98	28 36	7 78	25 81	491 20
1875.....	153 82	113 40	13 98	16 88	25 45	6 73	30 51	360 77
1876.....	143 34	114 45	18 68	22 75	17 90	2 86	24 93	344 91
1877.....	177 15	126 75	20 69	4 66	20 75	3 74	19 52	373 26
1878.....	176 16	124 23	30 43	13 94	7 20	9 16	21 82	382 93
1879.....	134 27	95 10	3 25	15 91	6 39	6 31	7 40	268 63
1880.....	111 84	87 71	5 74	14 06	6 00	3 63	3 34	332 32
1881.....	112 44	81 14	6 86	12 73	5 55	2 56	5 34	226 62
1882.....	121 51	84 52	7 05	12 30	4 54	3 49	3 61	237 02
1883.....	123 81	92 56	6 03	11 04	4 26	2 24	2 82	242 75
1884.....	124 02	90 64	7 03	12 43	4 14	2 77	2 18	243 20
1885.....	169 05	84 33	6 33	15 05	3 90	2 93	2 95	284 54
1886.....	159 03	69 35	5 49	16 20	3 72	1 59	4 04	259 42
1887.....	127 80	59 10	5 88	15 38	3 88	93	3 81	216 78
1888.....	118 34	60 47	4 41	13 90	3 11	2 09	2 40	204 72
1889.....	131 70	59 11	7 20	12 93	4 13	2 07	2 46	219 60
1890.....	121 54	62 77	9 02	17 31	4 00	1 29	7 19	223 12
1891.....	88 35	54 79	3 83	20 43	3 40	1 89	8 81	181 50
1892.....	94 25	56 74	4 69	20 53	3 35	1 80	6 42	187 80
1893.....	95 50	53 55	5 43	22 60	3 39	2 69	10 20	193 36
1894.....	87 76	57 07	5 25	18 83	2 98	1 43	4 93	178 25
1895.....	90 83	61 15	9 90	20 41	2 51	3 10	5 93	193 83
1896.....	89 13	55 93	6 30	20 29	2 56	3 63	8 83	186 67
1897.....	89 09	58 18	8 36	19 11	2 95	3 86	10 20	191 75
1898.....	94 68	69 43	9 94	21 82	2 76	5 12	10 62	214 37
1899.....	113 31	72 91	8 31	33 96	2 50	2 73	8 80	242 52
1900.....	116 04	72 62	9 06	32 10	2 15	1 71	10 32	244 00
1901.....	99 16	66 65	10 12	18 52	3 25	1 07	6 77	205 54
1902.....	87 47	61 13	7 95	15 25	4 13	1 20	9 46	186 59
1903.....	82 36	57 86	8 58	14 77	3 24	1 91	9 93	178 65
1904.....	87 43	60 01	6 85	17 84	4 48	2 10	9 18	187 89
1905.....	92 17	54 09	5 99	17 93	3 83	2 03	9 76	185 80
1906.....	88 76	53 15	5 16	15 92	3 57	1 21	10 02	177 79
1907.....	89 18	48 47	5 81	19 82	3 02	1 57	10 72	178 59
1908.....	90 93	49 17	6 61	17 63	4 56	1 79	13 23	183 92
1909.....	94 27	53 41	8 16	13 02	2 78	84	10 84	183 32
1910.....	95 97	48 43	7 87	21 32	2 02	1 15	7 67	184 43
1911.....	97 44	58 08	9 39	18 84	1 12	1 87	11 04	197 78
1912.....	78 40	56 37	10 09	19 36	1 79	1 50	10 20	177 71
1913, M.H., New West.	102 37	54 07	9 43	25 27	4 74	3 21	18 27	217 36
1913, M.H., Essondale.	93 56	49 90	5 50	25 13	55	1 02	14 10	184 76
1914, M.H., New West.	115 72	68 15	2 99	24 13	69	2 64	44 24	258 56
1914, M.H., Essondale.	113 06	81 42	15 49	28 93	4 14	1 19	24 13	268 36
1915, M.H., New West.	110 94	64 32	7 57	20 30	....	1 88	33 52	238 53
1915, M.H., Essondale.	95 25	62 84	9 44	24 87	1 14	56	26 89	220 99
1916, M.H., New West.	105 89	74 96	2 58	18 52	....	1 45	18 00	221 40
1916, M.H., Essondale.	89 26	75 18	17 76	26 96	4 98	42	31 35	245 91
1917, M.H., New West.	103 41	72 20	10 52	18 29	....	2 38	24 92	231 72
1917, M.H., Essondale.	83 57	79 98	18 92	23 39	4 77	81	20 61	232 05

TABLE B 1.

Showing Analysis of the Gross *Per Capita* Cost.

Year.	Salaries.	Office Supplies.	Travelling Expenses.	Fuel, Water, Light.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$102.815	$2.133	$0.097	$27.186	$3.706	$9.547	$ 99.989	$ 7.103	$2.102	$4.103	$8.694	$267.47
1918, Essondale.....	96.777	3.000	0.482	33.378	5.849	8.438	118.888	17.235	1.663	0.060	9.266	295.03
1919-20, New Westminster (15 months)..	168.789	4.375	0.581	45.794	19.216	10.052	133.599	5.467	5.061	14.230	13.806	420.970
1919-20, Essondale (15 months)	155.850	3.812	1.218	47.000	31.584	12.414	176.575	27.488	2.118	1.466	13.856	473.381
1919-20, Saanich (373 days).....	160.550	4.954	3.372	41.927	15.894	10.336	140.601	26.270	1.931	6.183	34.708	446.726
1920-21, New Westminster	150.462	3.535	0.513	39.685	20.993	18.365	122.845	17.038	6.392	13.549	18.069	411.446
1920-21, Essondale	132.321	3.754	1.399	35.996	21.890	13.587	147.415	35.304	3.037	0.279	8.542	403.524
1920-21, Saanich.....	153.924	2.070	1.783	54.736	30.275	6.654	131.475	31.359	5.173	0.140	61.481	479.470

TABLE C.

Showing the Total Expenditure of the Mental Hospital annually since its Inception, analysed under its Various Headings.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture (estimat'd)	Medicines, etc.	Miscellaneous.	Total of Current Expenditure.	Expenditure on Capital Account.			
									New Furniture.	Library.	Surgical Instruments.	Lands and Works.
1872-87	$91,899 70	$59,567 24	$6,482 84	$9,317 03	$5,331 52	$2,307 04	$6,131 55	$181,042 26	$2,600 00	.....	.....	$917 26
1888	9,399 96	4,803 57	350 17	1,103 86	247 24	165 60	190 66	16,261 06	.....	.....	$ 32 00	224 34
1889	9,390 62	4,214 19	513 73	922 00	293 69	147 76	175 80	15,657 79	.....	.....	.....	625 56
1890	9,575 13	4,945 57	710 64	1,363 52	315 28	101 90	565 96	17,577 80	2,800 00	.....	.....	2,181 91
1891	10,590 28	6,568 27	459 58	2,449 09	406 84	226 31	1,056 66	21,757 03	900 00	.....	.....	1,001 86
1892	11,803 83	7,106 64	587 48	2,571 26	418 82	226 19	804 15	23,518 37	.....	.....	.....	433 99
1893	12,790 28	7,172 53	729 38	3,029 00	452 55	362 08	1,369 16	25,904 98	650 00	$ 19 00	10 75	718 49
1894	13,044 16	8,492 53	771 05	2,799 87	442 69	212 86	732 67	26,495 83	200 00	.....	.....	170 32
1895	14,802 47	9,963 54	1,611 96	3,324 54	419 01	502 90	963 47	31,587 89	1,800 00	.....	.....	1,915 28
1896	15,280 62	9,588 22	1,079 85	3,479 46	439 36	623 24	1,511 05	32,001 40	800 00	.....	148 01	1,126 74
1897	16,829 76	10,991 05	1,579 08	3,610 03	557 97	728 73	1,928 14	36,224 76	1,200 00	5 15	19 00	848 38
1898	20,502 31	15,032 71	2,153 11	4,725 96	598 05	1,109 66	2,298 45	46,420 25	2,700 00	.....	6 39	5,320 30
1899	25,658 15	16,511 05	1,882 13	7,690 35	566 86	617 27	1,991 64	54,917 45	1,300 00	8 60	.....	2,518 80
1900	28,224 96	17,665 60	2,203 97	7,807 15	521 96	415 10	2,510 46	59,349 20	2,400 00	29 10	11 89	1,806 10
1901	26,729 01	17,967 31	2,727 11	4,993 67	875 30	288 40	1,823 28	55,406 08	1,840 53	25 10	14 65	5,175 20
1902	25,945 89	18,132 13	2,359 90	4,525 45	1,221 87	354 38	2,806 03	55,345 65	1,157 47	104 20	19 20	5,561 42
1903	27,362 37	19,222 50	2,850 19	4,906 22	1,077 73	634 16	3,300 40	59,353 57	1,723 70	111 48	9 00	8,426 70
1904	30,735 95	21,096 19	2,409 34	6,271 55	1,574 84	738 85	3,226 04	66,052 76	1,463 48	132 53	16 95	4,593 88
1905	31,421 45	18,437 99	2,043 45	6,110 76	1,306 22	693 49	3,328 71	63,342 07	1,711 84	91 47	69 15	3,981 72
1906	33,243 80	19,908 19	1,934 15	5,965 32	1,337 80	453 41	3,754 02	66,596 69	1,365 76	100 30	114 16	5,564 03
1907	37,394 21	20,326 99	2,439 64	8,314 36	1,265 63	655 66	4,498 15	74,874 64	4,352 22	150 88	144 63	9,410 66
1908	44,626 20	24,132 49	3,244 77	8,652 81	2,239 68	877 40	6,496 14	90,269 49	5,646 86	127 50	91 01	10,775 00
1909	49,665 85	28,142 65	4,298 91	6,856 11	1,465 79	441 59	5,715 42	96,586 32	2,598 95	89 58	21 30	16,615 10
1910	54,049 80	27,278 49	4,437 29	12,014 30	1,141 57	653 09	4,325 90	103,900 44	4,043 58	139 76	9 50	12,465 08
1911	62,453 00	37,229 56	6,020 57	12,079 62	722 10	1,200 92	7,076 73	126,782 50	11,169 78	154 75	43 82	14,429 02
1912	57,755 68	41,531 72	7,433 68	14,266 18	1,318 66	1,105 82	7,512 32	130,924 06	4,477 21	187 46	301 15	13,144 06
1913, New Westminster.	56,359 76	29,767 27	5,191 33	13,909 72	2,608 03	1,767 42	10,060 18	119,663 71	4,697 77	131 93	69 13	17,701 00
1913, Essondale. (9 mos.)	35,993 98	17,271 35	2,117 73	9,669 99	208 76	395 80	5,422 23	71,079 84	46,680 54	212 79	.....	14,904 63
1914, New Westminster.	56,381 62	33,204 11	1,455 28	11,758 11	338 03	1,286 68	21,557 62	125,981 45	.....	4,417 50	.....	10,117 16
1914, Essondale	55,364 40	39,873 66	7,585 71	14,168 66	2,026 29	584 23	11,817 49	131,420 44	1,087 31	.....	.....	4,236 37
1915, Essondale	53,392 50	35,225 51	5,287 03	13,942 39	639 67	316 87	15,074 46	123,878 43	841 31	.....	.....	4,628 99
1915, New Westminster.	57,217 21	33,174 90	3,902 49	10,469 03	.....	969 58	17,288 49	123,021 70	1,044 11	.....	.....	5,910 38
1916, New Westminster.	55,501 35	39,294 07	1,349 48	9,696 04	.....	777 94	9,433 33	116,052 21	1,395 09	.....	.....	8,623 88
1916, Essondale	56,515 64	47,601 27	11,242 29	17,066 96	3,154 13	268 96	19,849 12	155,698 37	2,418 80	.....	.....	14,402 82
1917, New Westminster.	55,393 19	38,674 92	5,639 40	9,795 36	.....	1,275 54	13,346 27	124,124 68	1,538 13	.....	.....	3,455 96
1917, Essondale	59,862 30	57,294 25	13,555 03	16,759 02	3,415 42	578 58	14,766 91	166,231 51	1,611 63	.....	.....	10,515 80

TABLE C 1.

Showing Gross Expenditure in Profit and Loss Accounts for Year analysed under its Various Headings.

Year.	Salaries.	Office Supplies and Postage.	Travelling Expenses.	Fuel, Water, Light, and Power.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$60,185 88	$1,248 42	$ 57 32	$15,913 89	$2,169 74	$5,588 44	$58,531 74	$ 4,157 86	$1,230 61	$2,401 62	$5,089 33	$156,574 85
1918, Essondale..	72,853 08	2,258 13	363 14	25,126 54	4,403 10	6,351 27	89,496 23	12,974 41	1,252 08	44 75	6,975 64	222,097 37
1919-20, New Westminster (15 months) ..	94,878 17	2,459 16	326 40	25,741 44	10,801 50	5,650 38	75,097 52	3,073 27	2,844 64	7,998 75	7,760 67	236,631 90
1919-20, Essondale (15 months)	117,738 67	2,879 47	920 30	35,512 26	23,860 37	9,380 10	133,395 18	20,766 40	1,601 14	1,107 67	10,469 43	357,630 99
1919-20, Saanich (373 days).....	14,531 52	448 35	305 12	3,794 84	1,438 56	935 58	12,725 70	2,377 75	174 86	559 65	3,141 35	40,433 28
1920-21, New Westminster	85,383 61	2,006 14	291 39	22,520 67	11,912 85	10,421 97	69,711 30	9,668 82	3,627 47	7,689 08	10,253 46	233,486 76
1920-21, Essondale	111,370 33	3,131 52	1,167 54	30,025 06	18,258 58	11,332 97	122,960 16	29,447 19	2,533 64	232 90	7,125 46	336,585 35
1920-21, Saanich.....	16,726 99	224 99	193 75	5,948 25	3,290 09	657 94	14,287 41	3,407 80	562 19	15 30	6,681 16	51,995 87

TABLE D.

Summary Statement showing the Gross and Net *Per Capita* Cost of Insane Patients in the Three Institutions.

Public Hospital for Insane, New Westminster—			
Total maintenance vouchers		$223,013 86	
Colony Farm Produce Account		22,506 09	
Mental Hospital, Essondale Account		457 97	
March 31, 1920. Inventory, coal		33 35	
" " " engineer's material		3,176 04	
" " " furniture and fixtures		2,130 92	
" " " provisions		3,966 02	
" " " clothing		7,128 55	
" " " miscellaneous		113 18	
Less Tailor Account for Essondale	$12,788 50	$262,525 98	
" Shoemaker Account for Essondale	93 50		
" Tailor Account, Saanich	1,745 00		
" Colony Farm Account, hogman	1,320 00		
" Colony Farm Account, sundries	249 40		
" Colony Farm, patient-labour	1,486 00		
" Sundry supplies to Essondale	541 25		
" Sundry supplies to Boys' Industrial School	252 00		
" March 31, 1921. Inventory, maintenance and repairs	195 17		
" " " " furniture and fixtures	3,015 20		
" " " " provisions	3,679 11		
" " " " clothing	4,924 86		
" " " " miscellaneous	235 23		
		30,525 22	
Total, Public Hospital for the Insane, New Westminster			$232,000 76
Provincial Mental Hospital, Essondale—			
Total maintenance vouchers		$283,862 35	
Colony Farm Produce Account		53,151 23	
New Westminster Hospital Account, Tailor Account		12,788 50	
" " Shoemaker Account		93 50	
" " sundry supplies		541 25	
" " gratuity, C. H. Gooding (1919–20 vote)		330 00	
March 31, 1920. Inventory, coal		1,611 05	
" " " engineer's material		3,984 20	
" " " furniture and fixtures		2,687 35	
" " " provisions		2,244 71	
" " " clothing		8,666 48	
" " " miscellaneous		150 74	
		$370,111 36	
Less supplies to New Westminster Hospital	$ 457 97		
" Colony Farm, patient-labour	17,756 00		
" " board of employees	10,915 40		
" " sundries	70 16		
" " fuel	2,216 01		
" " uniforms	356 40		
" Essondale School, fuel	114 00		
" S.C.R. Department, fuel	130 22		
" S.C.R. Department, meals for students	4,992 00		
" March 31, 1921. Inventory, fuel	795 20		
" " " " maintenance and repairs	983 77		
" " " " furniture and fixtures	3,360 83		
" " " " provisions	2,335 50		
" " " " clothing	6,798 55		
		51,282 01	
Total, Provincial Mental Hospital, Essondale			318,829 35
Carried forward			$ 550,830 11

TABLE D—*Continued.*

Summary Statement showing the Gross and Net *Per Capita* Cost—*Continued.*

Brought forward		$ 550,830 11
Mental Hospital, Saanich—		
Total maintenance vouchers	$ 49,378 16	
Colony Farm, sundry supplies	293 30	
New Westminster Institution, uniforms and clothing	1,745 00	
March 31, 1920. Inventory, coal	231 00	
" " " provisions	112 13	
" " " clothing	542 90	
" " " medical and surgical supplies	215 00	
" " " miscellaneous	512 00	
	$ 53,029 49	
Less March 31, 1920. Inventory, furniture and fixtures .. $106 67		
" " " " provisions 305 81		
" " " " clothing 596 14		
" " " " medical and surgical supplies 25 00		
	1,033 62	
Total, Saanich Institution		51,995 87
Total operating expense for the three institutions, New Westminster Hospital, Essondale Hospital, Saanich Hospital		$602,825 98
Less collections remitted to Treasury—		
Public Hospital for the Insane, New Westminster	$ 38,323 55	
Provincial Mental Hospital, Essondale	46,418 81	
Mental Home, Saanich	3,580 31	
		88,322 67
Total net expense for the three institutions		$514,503 31

Total average population for the three institutions, 1,510.25, showing a net *per capita* cost at the rate of $340.67 per year, or 93⅓ cents per day.

TABLE E.

Expense and Revenue Statement of the New Westminster Hospital for 12 Months ending March 31st, 1921.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Officers	$11,285 57	
Employees	75,418 04	
		$ 86,703 61
Office supplies, etc.—		
Books, journals, etc.	$ 312 01	
Postage and office supplies	1,009 18	
Telephone and telegraph	684 95	
		2,006 14
Travelling expenses		291 39
Fuel, water, light, and power—		
Fuel	$17,243 86	
Water	3,173 17	
Light and power	2,070 29	
		22,487 32
Maintenance and repairs of buildings, etc.—		
Repairs and renewals	$ 8,204 80	
Janitors' supplies, etc.	1,007 18	
		9,211 98
Carried forward		$120,700 44

TABLE E—*Continued.*

Expense and Revenue Statement of the New Westminster Hospital—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$120,700 44
Operating expenditure by voucher—*Continued.*		
Furniture and fixtures—		
Bedding	$ 5,966 57	
Furniture and fixtures	858 58	
Miscellaneous	4,359 60	
		11,184 75
Provisions—		
Groceries and flour	$37,105 73	
Meats	10,819 56	
Fish	2,797 25	
		50,722 54
Uniforms and clothing—		
Clothing	$19,762 94	
Boots and slippers	2,329 19	
		22,092 13
Medical and surgical supplies—		
Medicine and drugs	$ 2,714 66	
Surgical instruments, etc.	912 81	
		3,627 47
Examinations, committals and transportation,—		
Examinations	$ 792 50	
Committals	55 00	
Transportation	6,841 58	
		7,689 08
Incidentals and unforeseen—		
Amusements	$ 213 63	
Gratuities	214 24	
Funerals	520 00	
Auto-tires	456 63	
Auto-repairs	247 91	
Gasolene and oils	1,374 05	
Tools and garden implements	510 09	
Freight and cartage	17 67	
Sundries	3,443 23	
		6,997 45
Total expenditure for year by voucher		$223,013 86
Institution Trading Accounts—		
From Colony Farm—		
Dairy supplies	$10,408 19	
Fruit, vegetables, etc.	4,128 83	
Meats	4,381 01	
Sundry supplies, horse-labour	3,588 06	
		22,506 09
From Mental Hospital Essondale, sundry supplies		457 97
		$245,977 92

Summary of Profit and Loss Accounts.

		Yearly *Per Capita* Cost.
Salaries	$ 85,383 61	$150.462
Expenses—		
Office supplies, etc.	2,006 14	3.535
Travelling expenses	291 39	.513
Fuel, water, light, and power	22,520 67	39.685
Carried forward	$110,201 81	$194.195

TABLE E—*Continued.*

Expense and Revenue Statement of the New Westminster Hospital—*Continued.*

Summary of Profit and Loss Accounts—Continued.

Brought forward	$110,201 81	$194.195
Expenses—*Continued.*		
Maintenance and repairs	11,912 85	20.993
Furniture and fixtures	10,421 97	18.365
Provisions	69,711 30	122.845
Clothing, boots, slippers, etc.	9,668 82	17.038
Medical and surgical supplies	3,627 47	6.392
Examinations, committals, and transportation	7,689 08	13.549
Incidentals and unforeseen	10,253 46	18.069
Total gross expenditure	$233,486 76	$411.446
Less patient-labour (against market price for farm produce)	1,486 00	2.618
	$232,000 76	$408.828
Less Revenue Account (maintenance)	38,323 55	67.533
Net cost of patients' maintenance to Government	$193,677 21	$341.295

Remarks.

Total patients in residence, New Westminster, March 31st, 1921	578
Daily average population, New Westminster, March 31st, 1921	567.47
Gross maintenance *per capita* cost, 1 year	$411.44
„ „ „ 1 day	1.127
Net maintenance *per capita* cost, 1 year	341.29
„ „ „ 1 day	.935

Capital Expenditure.

Nurses' Home	$37,141 30
Cemetery	610 89
Total	$37,752 19

TABLE F.

Expense and Revenue Statement of the Essondale Hospital for 12 Months ending March 31st, 1921.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Officers	$15,003 96	
Employees	95,366 37	
		$110,370 33
Office supplies—		
Books, journals, etc.	$ 252 13	
Postage and office supplies	1,796 83	
Telegraph and telephone	1,082 56	
		3,131 52
Travelling expenses		1,167 54
Fuel, water, light, and power—		
Fuel	$24,677 18	
Water	4,532 58	
Light and power	2,459 68	
		31,669 44
Carried forward		$146,338 83

TABLE F—*Continued.*

Expense and Revenue Statement of the Essondale Hospital—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$146,338 83
Operating expenditure by voucher—*Continued.*		
Maintenance and repairs—		
Repairs and renewals	$12,841 02	
Janitors' supplies	2,417 13	
		15,258 15
Furniture and fixtures—		
Bedding	$ 6,824 67	
Furniture and fixtures	1,259 83	
Miscellaneous	4,015 45	
		12,099 95
Provisions—		
Groceries and flour	$62,571 30	
Meats	20,041 31	
Fish	3,892 43	
		86,505 04
Uniforms and clothing—		
Clothing	$12,449 25	
Boots and slippers	2,604 41	
		15,053 66
Medical and surgical supplies—		
Medicine and drugs	$ 1,355 94	
Surgical instruments	1,177 70	
		2,533 64
Examinations, committals, and transportation		232 90
Incidentals and unforeseen—		
Amusements	$ 919 05	
Gratuities	198 82	
Funerals	863 00	
Auto-tires	313 70	
Auto-repairs	422 11	
Gasolene and oils	1,068 34	
Tools and garden implements	246 94	
Freight and cartage	14 15	
Sundries	1,794 07	
		5,840 18
Total expenditure for year by voucher		$283,862 35
Institution Trading Accounts—		
Colony Farm supplies—		
Dairy supplies	$23,246 22	
Beef, pork, mutton, etc.	9,602 80	
Horse-labour, etc.	856 20	
Vegetables, fruit, etc.	16,272 36	
Eggs and dressed fowl	3,173 65	
		53,151 23
Public Hospital for the Insane—		
Tailor-shop—		
Attendants' uniforms	$ 7,860 00	
Patients' clothing	4,928 50	
		12,788 50
Shoemaker-shop		93 50
Sundry supplies		541 25
		$350,436 83

TABLE F—*Continued.*

Expense and Revenue Statement of the Essondale Hospital—*Continued.*

Summary of Profit and Loss Accounts.

		Yearly *Per Capita* Cost.
Salaries	$110,370 33	$132.321
Expenses—		
Office supplies, etc.	3,131 52	3.754
Travelling expenses	1,167 54	1.399
Fuel, water, light, and power	30,025 06	35.996
Maintenance and repairs	18,258 58	21.890
Furniture and fixtures	11,332 97	13.587
Provisions	122,960 16	147.415
Clothing	29,447 19	35.304
Medical and surgical supplies	2,533 64	3.037
Examinations, committals, and transportation	232 90	.279
Incidentals and unforeseen	7,125 46	8.542
Total gross expenditure	$336,585 35	$403.524
Less patient-labour (against market price, for farm produce)	17,756 00	21.287
	$318,829 35	$382.237
Less Revenue Account (maintenance)	46,418 81	55.650
Net cost to Government for maintenance of patients	$272,410 54	$326.587

Remarks.

Total patients in residence, Essondale, March 31st, 1921	874
Daily average population, Essondale, March 31st, 1921	834.107
Gross maintenance *per capita* cost, 1 year	$403.52
„ „ „ 1 day	1.105
Net maintenance *per capita* cost, 1 year	326.58
„ „ „ 1 day	.895

Capital Expenditure.

Attendants' cottages	$11,145 41
Shop buildings	3,067 90
Addition to annex	12,684 21
Improvements to grounds	1,556 94
Total	$28,454 46

TABLE G.

Expense and Revenue Statement of the Saanich Hospital for 12 Months ending March 31st, 1921.

Operating Expense Accounts.

Operating expenditure by voucher—		
Salaries—		
Officers	$ 2,820 00	
Employees	13,906 99	
		$ 16,726 99
Office supplies—		
Postage and office supplies	$ 103 14	
Telephone and telegraph	121 85	
		224 99
Travelling expenses		193 75
Carried forward		$ 17,145 73

TABLE G—*Continued.*

Expense and Revenue Statement of the Saanich Hospital—*Continued.*

Operating Expense Accounts—Continued.

Brought forward		$ 17,145 73
Operating expenditure by voucher—*Continued.*		
Fuel, water, light, and power—		
Fuel	$ 4,732 27	
Water	31 24	
Light and power	953 74	
		5,717 25
Maintenance and repairs—		
Repairs and renewals	$ 2,822 29	
Janitors' supplies	467 80	
		3,290 09
Furniture and fixtures—		
Bedding	$ 181 33	
Furniture and fixtures	388 90	
Miscellaneous	194 38	
		764 61
Provisions—		
Groceries and flour	$ 8,806 25	
Meats	5,079 92	
Fish	594 92	
		14,481 09
Clothing—		
Clothing	$ 1,258 01	
Boots and slippers	458 03	
		1,716 04
Medical and surgical supplies—		
Medicine and drugs	$ 306 32	
Surgical instruments	65 87	
		372 19
Examinations, committals, and transportation		15 30
Incidentals and unforeseen—		
Amusements	$ 1,170 44	
Gasolene and oils	10 02	
Tools and garden implements	188 15	
Freight and cartage	126 81	
Sundries	4,380 44	
		5,875 86
Total expenditure for year by voucher		$ 49,378 16
Institution Trading Accounts—		
Colony Farm—Sundry supplies		293 30
New Westminster Hospital—Clothing and uniforms		1,745 00
		$ 51,416 46

Summary of Profit and Loss Accounts.

		Yearly *Per Capita* Cost.
Salaries	$16,726 99	$153.924
Expenses—		
Office supplies, etc.	224 99	2.070
Travelling expenses	193 75	1.783
Fuel, water, light, and power	5,948 25	54.736
Carried forward	$23,093 98	$212.513

Mental Hospital, Essondale.

TABLE G—*Continued.*

Expense and Revenue Statement of the Saanich Hospital—*Continued.*

Summary of Profit and Loss Accounts—Continued.

Brought forward	$23,093 98	$212.513
Expenses—*Continued.*		
Maintenance and repairs	3,290 09	30.275
Furniture and fixtures	657 94	6.054
Provisions	14,287 41	131.475
Clothing	3,407 80	31.359
Medical and surgical supplies	562 19	5.173
Examinations, committals, and transportation	15 30	.140
Incidentals and unforeseen	6,681 16	61.481
Total gross expenditure	$51,995 87	$478.470
Less receipts of revenue (maintenance)	3,580 31	32.946
Net cost to Government for maintenance of patients	$48,415 56	$445.524

Remarks.

Total patients in residence, March 31st, 1921	114
Daily average population for 12 months	108.67
Gross maintenance *per capita* cost per year	$478.47
„ „ „ per day	1.31
Net maintenance *per capita* cost per year	445.52
„ „ „ per day	1.22

REVENUE OF MENTAL HOSPITALS SINCE INCEPTION.

1873	$1,440 99	1892	$ 2,418 43	1911	$30,100 20
1874	680 00	1893	1,585 40	1912	35,151 97
1875	1,342 60	1894	2,709 53	1913	40,756 56
1876	730 31	1895	4,409 23	1914	42,731 83
1877	799 91	1896	3,741 71	1915, New West.	18,046 21
1878	479 42	1897	3,816 80	1915, Essondale.	16,329 72
1879	867 38	1898	4,003 79	1916, New West.	18,135 91
1880	1,433 04	1899	4,769 04	1916, Essondale.	21,889 74
1881	614 99	1900	6,893 33	1917, New West.	21,435 93
1882	505 18	1901	12,800 76	1917, Essondale.	25,350 09
1883	298 24	1902	10,926 23	1918, New West.	35,169 86
1884	98 35	1903	13,639 64	1918, Essondale.	32,100 14
1885	.....	1904	15,004 22	1919-20, N. West.	45,921 06
1886	50 00	1905	16,613 18	1919-20, Es'ndale	53,740 40
1887	720 59	1906	19,058 42	1919-20, Saanich	3,215 39
1888	750 00	1907	20,753 35	1920-21, N. West.	38,323 55
1889	220 00	1908	25,807 83	1920-21, Es'ndale	46,418 81
1890	599 24	1909	25,845 65	1920-21, Saanich	3,580 31
1891	761 15	1910	26,137 38		

TAILOR'S REPORT, 1920–21.

ESSONDALE.

Uniforms—		
117 suits at $55	$6,435 00	
95 pairs pants at $15	1,425 00	
		$ 7,860 00
Clothing for patients—		
182 suits at $19	$3,458 00	
75 coats at $12.50	937 50	
82 pairs pants at $6.50	533 00	
		4,928 50
Carried forward		$ 12,788 50

ESSONDALE—*Continued.*

Brought forward		$ 12,788 50
Repairs—		
1,809 coats at 50 cents	$ 904 50	
1,137 vests at 30 cents	341 10	
3,148 pairs pants at 40 cents	1,259 20	
		2,504 80
Miscellaneous, labour only—		
29 white caps at 10 cents	$ 2 90	
42 laundry straps at 5 cents	2 10	
12 chair-seats	3 00	
		8 00
262 yards carpet bound at 10 cents	$ 26 20	
20 canvas coats at $4	80 00	
6 strong rugs at $7.50	45 00	
		151 20
		$ 15,452 50

COLQUITZ.

Uniforms—		
19 suits at $55	$1,045 00	
10 pairs pants at $15	150 00	
		$ 1,195 00
Clothing for patients—		
30 coats at $12.50	$ 375 00	
27 pairs pants at $6.50	175 00	
		550 00
		$ 1,745 00

NEW WESTMINSTER.

Uniforms—		
51 suits at $55	$2,805 00	
44 pairs pants at $15	660 00	
		$ 3,461 00
Clothing for patients—		
2 suits at $19	$ 38 00	
1 suit at $24	24 00	
51 coats at $12.50	637 50	
71 pairs pants at $6.50	461 50	
		1,161 00
Miscellaneous—		
63 bed ticks (labour only) at 35 cents	$ 22 05	
21 strong rugs at $7.50	157 50	
1 camisole	4 00	
2 canvas coats at $4	8 00	
		191 55
Repairs—		
246 coats at 50 cents	$ 123 00	
72 vests at 30 cents	21 60	
553 pairs pants at 40 cents	221 20	
2 camisoles at 30 cents	60	
18 strong rugs at $1.50	27 00	
		393 40
Carried forward		$ 5,206 95

NEW WESTMINSTER—*Continued.*

Brought forward			$ 5,206 95
Miscellaneous, incidentals—			
Pressing suits, making cushions, chair-covers, etc.			110 00
Essondale			15,452 50
Colquitz			1,745 00
			$ 22,514 45

STATEMENT OF TAILOR-SHOP, 1920–21.

Production—			
Uniforms for Essondale	$7,860 00		
Patients' clothing, Essondale	4,928 50		
Repairs, Essondale	2,504 80		
Miscellaneous work, Essondale	159 20		
		$15,452 50	
Uniforms for Saanich	$1,195 00		
Patients' clothing, Saanich	550 00		
		1,745 00	
Uniforms for New Westminster	$3,461 00		
Patients' clothing, New Westminster	1,161 00		
Repairs	393 40		
Miscellaneous	301 55		
		5,316 95	
		$22,514 45	
Material on hand, March 31st, 1921		2,518 70	
			$ 25,033 15
Costs—			
Material on hand, April 1st, 1920		$ 1,623 03	
Salaries—			
Tailor	$1,320 00		
Assistant tailors	2,110 00		
Seamstresses	2,268 00		
		5,698 00	
Material purchased		16,620 69	
Electric power	$ 41 50		
Electric light	30 00		
		71 50	
			24,013 22
Profit on operation			$ 1,019 93

SHOEMAKER'S REPORT, 1920–21.

NEW WESTMINSTER.

New work—		
91½ pairs men's boots	$ 852 85	
30 pairs men's slippers	105 00	
21 pairs women's slippers	61 00	
2 pairs women's boots	12 00	
		$ 1,030 85
Carried forward		$ 1,030 85

NEW WESTMINSTER—*Continued.*

Brought forward		$ 1,030 85
Repairs—		
394 pairs men's boots	$ 770 45	
31 pairs men's slippers	46 80	
126 pairs women's boots	175 65	
		992 90
		$ 2,023 75

ESSONDALE.

New work—		
6½ pairs men's boots	$ 61 50	
3 pairs women's boots	24 00	
2 pairs men's slippers	8 00	
		$ 93 50
Repairs—		
788 pairs men's boots	$1,333 85	
324 pairs men's slippers	318 60	
		1,652 45
		$ 1,745 95

STATEMENT OF SHOEMAKER-SHOP, 1920–21.

Production—			
New work for New Westminster	$1,030 85		
Repairs for New Westminster	992 20		
		$2,023 05	
New work for Essondale	$ 93 50		
Repairs for Essondale	1,652 45		
		1,745 95	
Material on hand, March 31st, 1921		137 32	
			$ 3,906 32
Costs—			
Salary of shoemaker		$1,320 00	
Material purchased		2,173 19	
Light and power		35 00	
Material on hand, April 1st, 1920		317 94	
			3,846 13
Profit on operations			$ 60 19

PRODUCTION TABLES.

Work done by Male Patients, New Westminster, 1920–21.

	Days.		Days.
Auto-truck	365	Lawns	2,845
Baker	1,044	Painter	743
Carpenter	918	Piggery, etc.	2,086
Chicken-run	788	Plaster	403
Dining-room	6,120	Plumber	353
Engineer	7,730	Porter	1,095
Farmer	6,872	Scullery	1,060
Florist	365	Shoemaker	1,250
Gardener	2,757	Tailor	610
Gate	365	Teamster	529
Kitchen	2,360	Ward-work	5,715
Laboratory	365	Cemetery	350
Laundry	2,127		

Work done by Patients, Essondale, 1920–21.

	Days.		Days.
Bake-shop	1,200	Grade, lawns and roads	6,244
Carpenter	305	Janitor-work	10,912
Civil Engineer	846	Kitchens	4,485
Dining-rooms	8,855	Land-clearing and ditching	4,492
Dykes and drains	4,113	Laundry	6,600
Engineer	2,629	Mason and plasterer	4,788
Excavation for Boys' Industrial School	9,523	Painter	2,798
Excavation for cottages	1,871	Stables and teams	2,019
Farm and nursery	17,756	Ward-work	27,280
General outdoor work	1,115		

Articles made by Female Patients, New Westminster, 1920–21.

Aprons	323	Sheets	1,017
Chemises	365	Table-cloths	79
Bureau-covers	42	Towels, roller	336
Dresses, gingham	122	„ tea	302
„ night	84	„ hand	198
Handkerchiefs	312	Tray-cloths	258
Neckties	276	Napkins, table	24
Mats, rag	2	Pillow-slips	1,342
Petticoats	196	Pillow-shams	20
Skirts	36	Sash-curtains	12

Articles made by Female Patients for Essondale, 1920–21.

Aprons	30	Table-cloths	71
Curtains, pairs	10	Sheets	247
Pillow-slips	349		

Mending done for Female Patients, 1920–21.

Aprons	323	Sheets	1,012
Blankets, wool	336	Skirts	1,701
Blouses	258	Spreads	332
Chemises	1,030	Table-cloths	170
Drawers, pairs	1,867	Towels, bath	17
Dresses, gingham	1,711	„ roller	27
„ serge	466	Ticks, bed	201
„ night	297	„ pillow	34
Hose, pairs	7,485	Undervests	1,910
Pillow-slips	155		

MENDING DONE FOR NURSES, 1920–21.

Aprons	320	Dresses	169

ARTICLES MADE FOR NURSES, 1920–21.

Aprons	150	Cuffs, pairs	66
Caps	75	Dresses	40

MENDING DONE FOR MALE PATIENTS, 1920–21.

Aprons	133	Spreads	418
Blankets, wool	206	Table-cloths	210
Drawers, pairs	2,834	Towels, bath	120
Pillow-slips	157	„ roller	84
Sheets	1,544	Ticks, bed	72
Shirts, top	2,365	White coats	73
„ under	2,282	Sweaters	6
Socks, pairs	11,632	Overalls, pairs	45

SUPPLIES, NEW WESTMINSTER.

SUPPLIES RECEIVED FROM HOME FARMER, 1920–21.

Chickens, dressed	354½ lb.	Pork, dressed	12,806 lb.
Ducks, dressed	242¼ „	Eggs	1,032 doz.

FRUIT PUT UP, 1920–21.

	Quarts.		Quarts.
Crab-apples	68	Red currants	88
Rhubarb	88	Plums	90
Gooseberries	22	Pears	65
Raspberries	30	Strawberries	92
Black currants	28		

PICKLES PUT UP, 1920–21.

	Quarts.
Tomatoes	155

GARDEN PRODUCE, NEW WESTMINSTER, 1920–21.

Fruit.

Apples	16,360 lb.	Black currants	72 lb.
Cherries	660 „	Rhubarb	4,815 „
Strawberries	925 „	Pears	1,260 „
Raspberries	949 „	Prunes	715 „
Gooseberries	210 „	Plums	1,500 „
Red currants	1,595 „		

Vegetables.

Green onions	2,875 lb.	Spinach	597 lb.
Cooking-onions	4,600 „	Turnips	3,675 „
Vegetable marrow	475 „	Beets	2,125 „
Pumpkins	2,060 „	Cabbage	4,360 „
Ripe tomatoes	928 „	String beans	115 „
Green tomatoes	1,400 „	Celery	212 heads.
Horse-radish	75 „	Parsley	48 bunches.
Early potatoes	5,725 „	Lettuce	109 dozen.
Late potatoes	800 „	Cucumbers	21
Green peas	330 „	Mint	4 bunches.
Green corn	651 dozen.	Parsnips	2,800 lb.
Carrots	21,395 lb.		

SUPPLIES, ESSONDALE.

SUPPLIES PRODUCED AT ESSONDALE, 1920–21.

Lard	1,415½ lb.
Preserved fruit	1,440 „
Soft soap (by-product)	28,800 lb. (at 6 cents per lb. = $1,728).

SUPPLIES, SAANICH.

PRODUCTION OF FARM AND GARDEN, MENTAL HOME, COLQUITZ, 1920–21.

Milk, 20,801.4 lb. at 4 cents	$ 832 04
Eggs, 479 dozen at 50 cents	239 50
Chicken, 32 lb. at 35 cents	11 20
Rabbits, 278 lb. at 30 cents	83 40
Geese, 156 lb. at 45 cents	70 20
Pork, 930 lb. at 30 cents	279 00
Veal, 180 lb. at 20 cents	36 00
Apples, 482 lb. at 5 cents	21 00
Broad beans, 144 lb. at 10 cents	14 40
String beans, 711 lb. at 7 cents	49 77
Beets, 6,170 lb. at 2½ cents	154 25
Cucumbers, 525 lb. at 5 cents	26 25
Celery, 200 heads at 7½ cents	15 00
Cauliflower, 520 at $1.50 a dozen	65 00
Corn, 1,653 heads at 2½ cents	41 33
Carrots, 11,870 lb. at $38 a ton	225 53
Kale, 383 lb. at 1½ cents	5 75
Lettuce, 2,204 heads at 3 cents	66 12
Leeks, 60 dozen at 25 cents	15 00
Melons, 46 at 15 cents	6 90
Marrows, 391 lb. at 1½ cents	5 86
Onions, green, 1,271 lb. at 2 cents	25 42
Onions, dry, 1,250 lb. at 3½ cents	43 75
Peas, green, 718 lb. at 10 cents	71 80
Pears, 163 lb. at 12½ cents	20 37
Plums, 25 lb. at 3 cents	75
Parsnips, 4,000 lb. at 1½ cents	60 00
Potatoes, 33,689 lb. at 2 cents	673 78
Radishes, 1,030 lb. at 2 cents	20 60
Raspberries, 48 lb. at 10 cents	4 80
Rhubarb, 3,082 lb. at 7 cents	215 74
Turnips, 190 lb. at 5 cents	9 50
Tomatoes, 121 lb. at 10 cents	12 10
Wheat, 1,012 lb. at 3 cents	30 16
Hay, 8,000 lb. at 2 cents	160 00
Cordwood, 108 cords at $8	864 00
Bedding-plants, etc., and flowers	75 00
Total	$4,551 27

PART III.—COLONY FARM.

ACTING FARM SUPERINTENDENT'S REPORT.

ESSONDALE, B.C., June 25th, 1921.

Dr. H. C. Steeves,
Medical Superintendent, Provincial Hospital for Insane,
New Westminster, B.C.

SIR,—I beg to submit herewith report of the farm operations for the twelve months ending March 31st, 1921.

Field crops were uniformly good and in spite of the very unfavourable season were safely harvested, the only loss being in straw.

Considerable development-work was done on the new Wilson Annex land; 28,560 feet of ditches were dug and some 23 additional acres brought under cultivation.

During the year the farm was connected with the City of New Westminster water system, the old source of supply by pumping through sand points having practically failed.

The dairy shows a small loss on operation, but it is pointed out that our product is considerably superior, both in regard to bacteria count and butter-fat content, to the commercial article. The fodder-crops were charged to the dairy cattle at a price which shows a considerable profit (in all, some $7,000) to the Crop Department. A heavy item of expense was for veterinary services, but it is hoped that this will be largely reduced for the future, as the herd is now in excellent condition. Very valuable work was done in connection with the agglutination and complement-fixation tests for abortion; three complete tests of this nature having been made during the year. The result was very gratifying, in that no reactors were found among the young stock born during the last two years.

During the year nine young bulls of excellent type and breeding were sold to farmers in the Province at an average price of $150 per head; nine heifers were sold in the Province at an average price of $175. The sale of these young animals should have a far-reaching effect in the improvement of dairy stock throughout the Province. Two young bulls were sold for export at an average price of $600.

The loss shown in the Mature Cow Department is chiefly attributable to the fact that their asset value in the books was reduced to the present market price, which is considerably lower than that ruling a year ago.

Young cattle are shown at the actual cost of raising them.

While the sheep show a loss on operation (chiefly due to the decrease in market price of wool and mutton), it must be remembered that this apparent loss is more than compensated for by their value in packing and keeping clean newly broken land.

Hogs show a somewhat smaller profit than in the preceding year. This is accounted for by the higher cost of feed and the low price of pork at the latter end of the period.

All of which is respectfully submitted.

R. GARDNER,
Acting Superintendent, Colony Farm.

BURSAR'S REPORT.

ESSONDALE, B.C., March 31st, 1921.

The Medical Superintendent,
Provincial Mental Hospital, Essondale, B.C.

SIR,—In reviewing the financial statements covering operations on Colony Farm during the fiscal year ending March 31st, 1921, it will be noted that the net profit made for the year, exclusive of patient-labour, was $2,907.13, whereas our previous report, which covered a period of fifteen months, showed $5,693.18. This difference, accounted for mostly in the Matured Cow Department, is made up of animals sold for beef, destroyed, or depreciation written off. In the

matter of depreciation, I might mention that during the year a complete revaluation was made of all stock. The various reductions, affecting practically all stock departments, account largely for the unfavourable showing in live stock.

Field crops showed a large profit and exceeded last year's report by $18,088.29, while truck-garden crops were not as successful, and the honey-crop was disappointing, the flow being poor throughout the Province generally.

The Dairy and Herds Department showed a small loss of $1,206.53 for the twelve months, but included in their operation is the heavy cost of testing cows and veterinary services. Milk production amounted to 730,557.10 lb. at a cost of $41,341.47, which cost includes profits made on field crop sold to Dairy Department, and also contains an expenditure of some $13,000 for test cows, which, however, produced about one-third of the supply of milk, amounting to 254,452.7 lb. The general herd cost $20,814.56 and produced 476,104.4 lb. of milk at 43 cents per gallon.

The Bull Department Profit and Loss Account shows a loss of $1,120.87, due entirely to depreciation written off animals.

Work-horses showed a profit of $3,907.03 and produced 37,065½ hours' team-labour.

All stock departments using feed worked under a severe handicap owing to the high prices prevailing.

Pork production decreased about 30 per cent. for the year, with a like reduction in expenditure of this department, while the year finished at March 31st with inventory value of stock on hand about the same as previous year. The market value on pork remained very steady last year, from 24 to 28 cents, whereas the year under review dropped to 20 cents per pound dressed.

The Maintenance Account, which includes administration, salaries and expenses, repairs and renewals to buildings, and general expenses, was practically the same as formerly.

All of which is respectfully submitted.

G. S. MACGOWAN,
Bursar.

BALANCE-SHEET, COLONY FARM AND BRANCHES.

APRIL 1ST, 1920, TO MARCH 31ST, 1921.

Assets.

		Assets.	Liabilities.
Land Account—			
Colony Farm	$155,777 75		
Wilson Annex	53,239 85		
		$209,017 60	
Buildings		162,329 67	
Water system		4,311 25	
Fencing, etc.		56,534 46	
Equipment		25,386 07	
Live stock—			
Bulls, as per inventory	$ 2,109 65		
Cows, as per inventory	29,960 52		
Young cattle, as per inventory	11,270 09		
Stallions, as per inventory	1,000 00		
Brood mares, as per inventory	13,968 50		
Work-horses, as per inventory	7,345 00		
Young horses, as per inventory	3,433 37		
Sheep, as per inventory	1,911 00		
Hogs, as per inventory	5,464 95		
Poultry, as per inventory	1,872 59		
		78,335 67	
Carried forward		$535,914 72	

BALANCE-SHEET, COLONY FARM AND BRANCHES—*Continued.*

Asests—Continued.

		Assets.	Liabilities.
Brought forward		$535,914 72	
Sundry inventories—			
Poultry-feed on hand	$ 140 47		
Feed and produce	11,051 78		
Dairy produce on hand	19 45		
Nursery and truck-garden	47,411 45		
		58,623 15	
Sundry accounts receivable		1,493 87	
Sundry notes receivable		2,009 57	
Growing Crops Apportionment Account		5,845 72	
Liabilities.			
Suspense Account		.....	$ 183 48
Uphill Account		.....	239 98
Surplus Account	$697,825 30		
Loss to March 31st, 1920	$33,683 26		
Loss Account, Sunbury	9,655 60		
	43,338 86		
	$654,486 44		
Profit, March 31st, 1921	2,907 13		
	$657,393 57		
Less Patient-labour Account	53,930 00		
			603,463 57
		$603,887 03	$603,887 03

PROFIT AND LOSS STATEMENT.

YEAR ENDING MARCH 31ST, 1921.

Departments.	Debits.	Credits.	Loss (Deaths).	Loss.	Gain.	Acreage.	Costs.
Dairy and herds	$ 44,363 07	$ 43,156 54	.....	$ 1,206 53	.....	....	Cost of milk, 56 cents per gallon.
Bulls, sales and deaths	1,471 98	351 11	.....	1,120 87	.....	....	
Service Account	.....	6 00	.....	.....	$ 6 00	....	
Cows, sales and deaths	9,972 84	3,417 96	$ 1,100 00	5,454 88	.....	....	
Young cattle, sales and deaths	7,786 93	7,395 22	.....	391 71	.....	....	
Young horses, sales and deaths	4,307 58	400 00	83 80	3,823 78	.....	....	
Work-horses, Labour Account	15,495 72	19,402 75	.....	.....	3,907 03	....	
Work-horses, sales and deaths	2,642 65	.....	880 00	1,762 65	.....	....	
Sheep	5,048 45	4,290 20	.....	758 25	.....	....	
Hogs	12,781 54	15,771 89	.....	.....	2,990 35	....	
Poultry	6,033 61	6,243 44	.....	.....	209 83	....	
Nursery and garden	68,266 87	71,439 79	.....	.....	3,172 92	....	
Tractor Account	2,323 64	1,908 75	.....	414 89	.....	....	
Prize-money received	.....	263 67	.....	.....	263 67	....	
Exhibition expenses	564 73	.....	.....	564 73	.....	....	
Shrinkage and rot	2,607 78	.....	.....	2,607 78	.....	....	
Crops, ensilage	2,233 64	6,043 99	.....	.....	3,810 35	56.25	Yield per acre, 14.32 tons; cost a ton, $ 2.77.
" hay	672 55	4,534 50	.....	.....	3,861 95	49.40	" 2.70 " ; " 5.03.
" oats	4,165 64	9,066 63	.....	.....	4,900 99	114.50	" 2,290 lb. ; " 22.59.
" seed-peas	93 95	199 00	.....	.....	105 05	3.00	" 1,146 " ; " 54.60.
" potatoes	4,648 71	18,802 61	.....	.....	14,153 90	46.73	" 15.23 tons; " 6.53.
" carrots	131 76	270 00	.....	.....	138 24	2.20	" 12.27 " ; " 4.87.
" onions	187 00	781 58	.....	.....	594 58	2.10	" 14.90 " ; " 5.98.
" mangles	1,034 11	2,609 59	.....	.....	1,575 48	12.00	" 21.68 " ; " 3.97.
" turnips	672 88	2,356 00	.....	.....	1,683 12	7.40	" 31.83 " ; " 2.85.
" swede turnips and cabbage	205 70	957 56	.....	.....	751 86	....	
Pasturage	436 43	649 00	.....	.....	212 57	....	
Maintenance	19,260 89	.....	.....	19,260 89	.....	....	
	$217,410 65	$220,317 78	$ 2,063 80	$37,366 96	$42,337 89	293.58	
					37,366 96		
					$ 4,970 93		Profit for farm (exclusive of deaths and patient-labour).
					2,063 80		Loss from deaths of stock.
					$ 2,907 13		Profit for farm after deductions.

Patient-labour	$19,242 00
Profit from farm	2,907 13
Loss after deducting patient-labour	$16,334 87

DAIRY AND HERDS DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Expenses.

Total expenses for 12 months	$41,341 47	
March 31, 1920. Inventory	21 60	
		$ 41,363 07

Production.

Dairy produce supplied institutions, etc.	$40,137 09	
March 31, 1921. Inventory	19 45	
		40,156 54
Loss in dairy, 12 months		$ 1,206 53

PRODUCTION AND COSTS ACCOUNT, MARCH 31ST, 1921.

			Production. Lb. Milk.
Dairy—			
Salaries and upkeep	$2,918 59		
Board of employees	180 00		
Coal	826 17		
		$ 3,924 76	
Test cows—			
Salaries and upkeep	$ 3,117 96		
Board of employees	1,330 00		
Feed	8,765 14		
Sundries	112 40		
		13,325 50	254,452.70
T.B. herd—			
Salaries and upkeep	$ 722 00		
Board of employees	451 00		
Feed	2,537 50		
Sundries	234 15		
		3,944 65	50,845.60
General herd—			
Salaries and upkeep	$ 5,258 79		
Feed	12,962 37		
Board of employees	1,579 40		
Pasturage	376 00		
Horse-labour	638 00		
		20,814 56	425,258.80
		$42,009 47	
Less allowance for manure		668 00	
		$41,341 47	
March 31, 1920. To inventory on hand		21 60	
		$41,363 07	730,557.10

MILK PRODUCTION, MARCH 31ST, 1921.

1920.	Production. Lb.	Cost.
April	62,597.00	$ 3,330 19
May	67,458.80	3,296 73
June	68,529.60	3,011 68
July	66,370.30	3,092 94
August	62,720.70	3,564 06
Carried forward	$327,676 40	$16,295 60

DAIRY AND HERDS DEPARTMENT—*Continued.*

MILK PRODUCTION—*Continued.*

	Production. Lb.	Cost.
Brought forward	$327,676.40	$16,295 60
September	59,669.50	3,267 55
October	56,096.90	3,379 59
November	54,488.30	3,361 12
December	58,021.10	4,058 88
1921.		
January	54,607.30	3,876 88
February	53,616.20	3,689 60
March	66,381.40	3,412 25
Totals	730,557.10	$41,341 47

Average cost of production, 56 cents per gallon.

BULL DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colony Wadmantge Canary	$ 321 98	$ 184 45	Butchered.
Colony Wadmantge Canary, compensation from Dominion Department of Agriculture	.....	166 66	
Aaggie Cornucopia Newman	1,000 00	.....	
Colony Purce Posch Paul, depreciation	150 00	.....	
	$1,471 98	$ 351 11	
	351 11		
Loss	$1,120 87		

BULL SERVICE ACCOUNT—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

E. Erskine	$2 00
A. Joseph	2 00
G. Hick	2 00
Profit	$6 00

MATURE COW DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

	Name of Animal.	Asset Value.	Selling-price.	Remarks.
1920.				
April 30.	To Colony Minnie Segis DeKol	$ 450 00	$ 750 00	Sold.
June 30.	One-half expenses, St. Paul sale	273 46	.....	
	Colony Jewel Segis	175 00	300 00	,,
	Colony Netherland Segis Newman	800 00	922 00	,,
July 31.	Colony Beets Korndyke	450 00	125 00	Sold for beef.
	Colony Pauline Canary	250 00	115 00	,, ,,
	Colony Jewel Newman	150 00	125 00	,, ,,
	Colony Korndyke Segis	125 00	125 00	,, ,,
Aug. 31.	Colony Bessie Canary	600 00	.....	Died.
Oct. 28.	Colony Marie McKinley	200 00	.....	Destroyed.
	Colony Segis Ragapple	350 00	139 23	Beefed.
	Colony Grebegga Sevis	400 00	150 62	,,
	Colony Minnie Poetess	50 00	120 19	,,
Nov. 2.	Colony Model Emma	100 00	.....	Died.
	3 hides, less cost of killing	.....	6 45	
	Colony Madam Pauline Abbekuk	50 00	.....	Destroyed.
1921.				
Jan. 5.	To Colony Lady McKinley	250 00	.....	Died.
,, 14.	Colony Alma Korndyke Segis	75 00	85 00	Beefed.
Feb. 11.	Colony Ragapple Cornucopia	450 00	179 18	,,
	Colony Doirdre Douglas	355 88	108 63	,,
Mar. 31.	Dominion Department Agriculture, compensation on account Colony Doirdre Douglas	.....	166 66	
	Loss on revaluation of herd by Farm Supt.	4,418 50	.....	
		$9,972 84	$3,417 96	
		3,417 96		
	Loss	$6,554 88		

Abstract of Loss.

Deaths	$1,100 00
Losses on cows butchered	1,583 38
Loss on revaluation	4,418 50
	$7,101 88
Less profits on cows sold	547 00
Total	$6,554 88

YOUNG CATTLE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colony Newman Newman	$ 166 46	$ 500 00	Sold.
One-half expenses of Superintendent to St. Paul sale	273 46	.....	
Colony Melbe Pride	339 55	300 00	„
Colony Canary Perfection	11 51	100 00	„
Colony Segis McKinley (*see* below)	351 05	1,843 83	„
Colony Sir Korndyke Newman	106 40	150 00	„
Colony Cornucopia Champion	112 30	225 00	„
Colony George Perfection	47 28	39 16	Vealed.
Colony Beets McKinley	313 23	85 00	Butchered.
Colony McKinley Mutual	77 74	38 28	Vealed.
Colony Koba Perfection	70 44	200 00	Sold.
Colony North Star McKinley	151 70	200 00	„
Colony Bos Perfection	58 35	200 00	„
Colony Frontier Champion	228 52	1,000 00	„
Colony Poem Ornsby	152 35	225 00	„
Colony Molly Newman	43 90	90 00	„
Colony Vrouka Pride Newman	106 15	135 00	„
Colony Curldyke Newman	242 38	112 50	„
Colony Brightest Newman	256 22	225 00	„
Colony Pauline Newman	309 30	180 00	„
Colony Mercena Newman	313 90	202 50	„
Colony Girl Newman	225 06	247 50	„
Colony Alma Newman	198 50	180 00	„
Colony Rag Perfection	96 95	112 50	„
Colony Sir Colantha Champion	90 02	112 50	„
Colony Douglas Beets Newman	69 25	39 16	Vealed.
Colony Sir DeKol Newman	69 25	33 66	„
Calf No. 309	20 75	19 58	„
Account Colony Segis McKinley taken back	1,000 00	.....	
Colony Prince Pietge Champion	165 60	150 00	Sold.
Colony Shadeland McKinley	486 45	111 18	Butchered.
Colony Lass Valdessa	489 90	102 00	„
Colony Koba Netherland	520 95	103 87	„
Advertisement, *Columbian*	50 00	.....	
Advertisement, *Farm and Home*	75 00	.....	
Colony Model McKinley	62 23	.....	Destroyed.
Compensation Account, Colony Model McKinley	.....	20 00	
Colony King Colantha Newman	96 81	100 00	Sold.
Colony Prince Abbekuk Posch	38 03	.....	Died.
Colony Colquitz Pauline	6 79	.....	„
Colony Colquitz, C.C.	10 80	10 80	Vealed.
Account Colony Marie Tersen McKinley	282 40	.....	
Account Colony Merzies Note	.....	1 20	
	$7,786 93	$7,395 22	
	7,395 22		
Loss	$ 391 71		

Abstract of Loss.

Expenses, sales and advertisements	$ 398 46
Deaths	44 82
Losses on cattle butchered and destroyed	1,847 54
	$2,290 82
Profits on sales	1,899 11
Total	$ 391 71

YOUNG HORSE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colt, Colony Baroness	$ 83 80	.....	
Colony Royal Guest	1,090 80	$ 400 00	Sold.
Colony Lily Black	697 50	.....	Destroyed.
Colony Mint Master (written off on transfer to work-horses)	914 44	.....	
Colony Forest Queen (written off on transfer to work-horses)	1,521 04	.....	
	$4,307 58	$ 400 00	
	400 00		
Loss	$3,907 58		

Abstract of Loss.

Death	$ 83 80
Loss in transfer to Work-horse Department	3,823 78
Total	$3,907 58

WORK-HORSE DEPARTMENT.

SALES AND DEATHS ACCOUNT, MARCH 31ST, 1921.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Jin	$ 450 00	.....	Died.
Harry	400 00	.....	„
Ragged	30 00	.....	Destroyed.
Loss on revaluation by Farm Superintendent	1,762 65	.....	
Loss	$2,642 65		

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Expenses.

Salaries and upkeep	$5,506 37	
Feed for horses	7,558 60	
Board of employees	2,496 50	
Sundries	155 00	
		$15,716 47
Less teamsters' odd jobs	$ 28 75	
„ manure to fields	192 00	
„ blacksmith's work for Essondale grade	443 50	
„ blacksmith's work for Boys' Industrial School	426 75	
		1,091 00
		$14,625 47

Returns.

Horse-labour charged to Crop and other departments at 50 cents per one horse-hour	$18,532 50
Profit	$ 3,907 03

NOTE.—Against outlay of $14,625.47, 37,065½ hours of team-labour were performed, at a cost of 39 cents per hour on basis of one horse-hour.

WORK-HORSE DEPARTMENT—*Continued.*

HORSE-LABOUR PERFORMED, MARCH 31ST, 1921.

1920.	Hours.	Cost.
April	3,351½	$ 1,710 08
May	3,410	1,322 70
June	3,250½	1,192 92
July	3,062	1,067 89
August	3,347½	1,224 84
September	2,831½	1,068 23
October	2,678½	1,217 96
November	3,029½	1,310 63
December	3,079½	1,328 57
1921.		
January	2,948	1,363 20
February	2,791½	1,454 05
March	3,285½	1,234 65
	37,065½	$15,495 72
Less blacksmith's work, etc.		870 25
Cost		$14,625 47

Cost, 39 cents per hour on basis of one horse-hour.

SHEEP DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

By Sales—		
Ram lamb No. Col. 161 sold	$ 50 00	
B.C. Wool-growers, advance settlement	181 45	
Ram lamb No. Col. 172 sold	50 00	
4,537 lb. mutton and 1,905 lb. lamb to Essondale Hospital	1,610 50	
1,088 lb. mutton and 861 lb. lamb to New Westminster Hospital	487 25	
		$ 2,379 20
Inventory, March 31, 1921—		
26 aged ewes, pure-bred	$ 650 00	
12 shearling ewes, pure-bred	240 00	
1 aged ram, pure-bred	100 00	
7 shearling rams, pure-bred	140 00	
36 aged ewes, grade	540 00	
11 shearling ewes, grade	187 00	
3 shearling wethers, grade	54 00	
		1,911 00
		$ 4,290 20

Expenses.

Salaries and vouchers	$ 144 33	
Feed	803 12	
Board of employees	22 50	
Horse-labour	9 50	
Pasturage	240 00	
	$1,219 45	
Carried forward	$1,219 45	$ 4,290 20

SHEEP DEPARTMENT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward		$1,219 45	$ 4,290 20
Inventory, March 31, 1920—			
37 ewes, pure-bred	$1,480 00		
2 rams, pure-bred	115 00		
2 wethers, pure-bred	50 00		
94 ewes, grade	1,692 00		
19 wethers, grade	342 00		
		3,679 00	
Ram lamb purchased from R. P. Vigors		150 00	
			5,048 45
Loss			$ 758 25

HOG DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

Pork supplied Essondale Hospital, 23,676 lb.		$5,856 38	
Pork supplied New Westminster Hospital, 14,379 lb.		3,653 01	
Sale of live hogs, 32 head		797 55	
			$10,306 94
Inventory, March 31, 1921—			
Essondale, 39 hogs, 6,406 lb.		$ 864 95	
New Westminster—			
15 sows		1,500 00	
30 hogs, 8–9 months old		1,080 00	
35 „ 6–7 months old		1,050 00	
25 „ 4–6 months old		500 00	
35 „ 4–6 weeks old		245 00	
2 boars		225 00	
			5,464 95
			$15,771 89

Expenses.

Salaries	$2,809 11		
Feed	3,322 78		
Horse-labour	996 50		
Coal	42 00		
Board	36 00		
Freight	8 55		
		$7,214 94	
Inventory, March 31, 1920—			
Essondale, 31 hogs, 4,770 lb.	$ 858 60		
Carried forward	$ 858 60	$7,214 94	$15,771 89

HOG DEPARTMENT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Expesnes—Continued.

Brought forward	$ 858 60	$7,214 94	$15,771 89
Inventory—*Continued.*			
New Westminster—			
29 sows	2,175 00		
9 pigs (fat)	648 00		
23 shoats	690 00		
5 boars	370 00		
51 hogs, 3 months old	612 00		
42 „ 1 month old	168 00		
12 „ 2 weeks old	25 00		
9 „ 1 week old	20 00		
		5,566 60	
			12.781 54
Profit			$ 2,990 35

ESSONDALE INSTITUTION—PORK SUPPLIED BY COLONY FARM, MARCH 31ST, 1921.

1920.					
April.	8	hogs,	1,794 lb.	at 28 cents	$ 502 32
May.	10	„	1,894	„ 28–29 cents	541 23
June.	8	„	1,399	„ 29 cents	405 71
July.	8	„	1,517	„ 28 „	424 76
Aug.	10	„	1,919	„ 28 „	537 32
Sept.	8	„	1,451	„ 27–28 cents	399 23
Oct.	9	„	1,367	„ 30 cents	410 10
Nov.	12	„	2,099	„ 27 „	565 65
Dec.	10	„	1,885	„ 22–25 cents	424 38
„	3	„	607	„ 14 cents (live)	84 90
1921.					
Jan.	13	„	2,610	„ 22–24 cents	605 02
„	5	„	1,390	„ 14 cents (live)	162 88
Feb.	9	„	2,031	„ 21–22 cents	441 63
Mar.	8	„	1,713	„ 20–21 „	351 25
		Total (23,676 lb.)			$ 5,856 38

NEW WESTMINSTER INSTITUTION—PORK SUPPLIED BY COLONY FARM, MARCH 31ST, 1921.

1920.					
April.	4	hogs,	1,517 lb.	at 28 cents	$ 424 76
May.	5	„	1,632	„ 29 „	473 28
June.	4	„	1,059	„ 28 „	296 50
July.	4	„	1,191	„ 28 „	333 48
Aug.	5	„	1,119	„ 28 „	313 32
Sept.	4	„	947	„ 28 „	265 16
Oct.	4	„	1,068	„ 30 „	320 40
Nov.	5	„	1,046	„ 27 „	282 02
Dec.	4	„	831	„ 23 „	191 13
„	7	„	1,563	„ 14 „ (live)	218 90
1921.					
Jan.	5	„	1,034	„ 23 „	237 82
Feb.	4	„	812	„ 22 „	178 64
Mar.	4	„	560	„ 21 „	117 60
		Total (14,379 lb.)			$ 3,653 01

POULTRY DEPARTMENT.

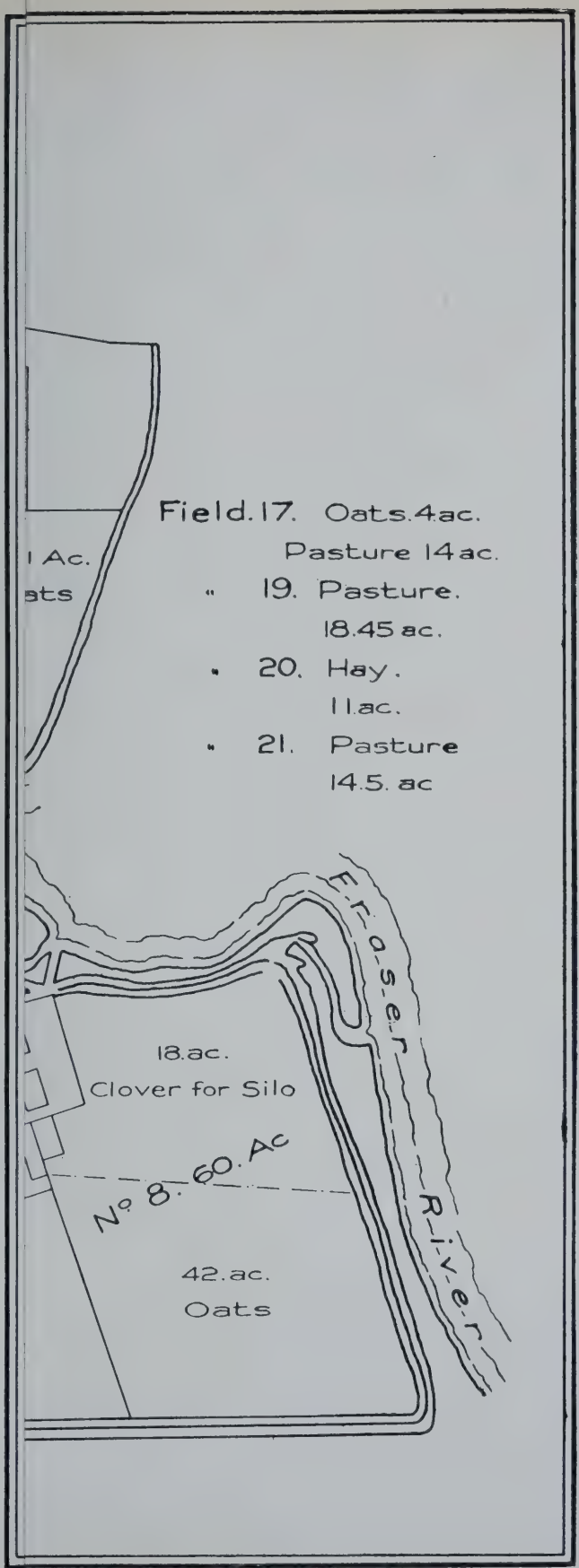
PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

By 5,942 dozen eggs supplied Mental Hospital, Essondale		$3,173 65	
2,063½ lb. dressed poultry		905 96	
Poultry, etc., to New Westminster		20 02	
12 hens and 13 sittings to New Westminster		43 00	
30 pullets to Saanich		82 50	
21 lb. feathers to Essondale		5 25	
Inventory, March 31, 1921—			
236 Leghorn hens	$ 531 00		
279 „ pullets	697 50		
119 R.I. Reds	309 40		
29 Orpingtons	75 40		
10 cockerels	50 00		
100 baby chicks	60 00		
110 „	49 50		
165 „	57 75		
Eggs in incubators	35 00		
22 dozen eggs on hand	7 04		
		1,872 59	
Feed on hand		140 47	
			$ 6,243 44

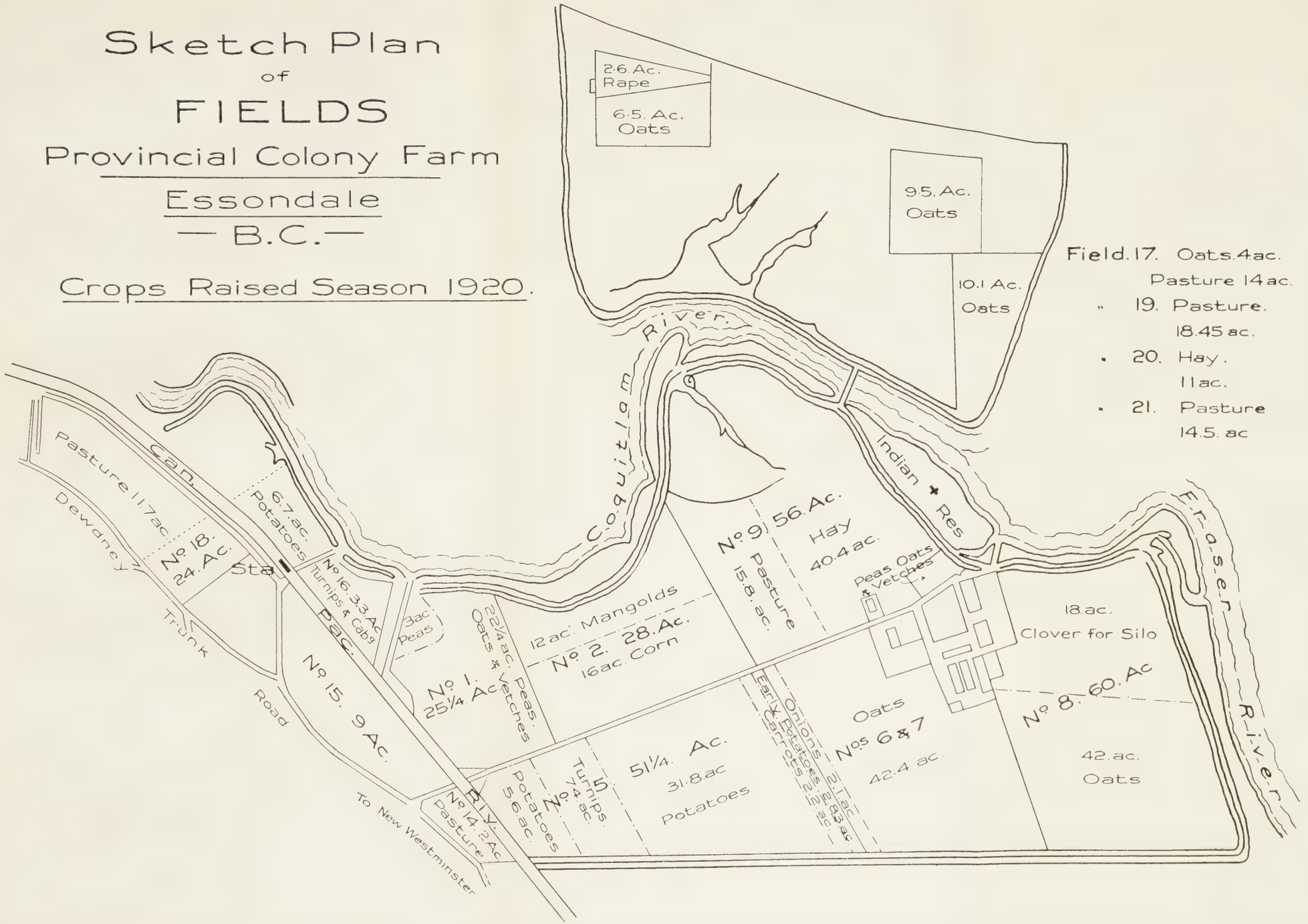
Expenses.

Salaries and vouchers	$1,081 61		
Feed	2,522 53		
Horse-labour	300 00		
Sundries	128 25		
		$ 4,032 39	
Inventory, March 31, 1920—			
214 Leghorn hens	$ 481 50		
282 „ pullets	705 00		
96 Orpington hens	240 00		
36 „ pullets	99 00		
35 R.I. Red pullets	96 25		
11 cockerels	55 00		
3 „	4 75		
240 chicks	144 00		
125 „	56 25		
45 dozen eggs in incubators	20 25		
20 dozen eggs	9 00		
		1,911 00	
Feed on hand		90 22	
			6,033 61
Profit			$ 209 83


1 Ac.
sts
Field. 17. Oats. 4 ac.
Pasture 14 ac.
" 19. Pasture.
18.45 ac.
" 20. Hay.
11 ac.
" 21. Pasture
14.5. ac
Fraser River
18. ac.
Clover for Silo
No 8. 60. Ac
42. ac.
Oats

Sketch Plan
of
FIELDS
Provincial Colony Farm
Essondale
— B.C. —

Crops Raised Season 1920.



Field. 17. Oats. 4 ac.
Pasture 14 ac.
" 19. Pasture.
18.45 ac.
" 20. Hay.
11 ac.
" 21. Pasture
14.5. ac

TRUCK-GARDEN AND NURSERY.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

Onion and potato seed supplied		$ 145 00	
Produce supplied Essondale Instituiton		14,232 07	
„ New Westminster Institution		635 82	
Hog and feed supplied		157 00	
Shrubs, etc., supplied Essondale		385 00	
„ „ New Westminster		92 00	
„ „ Public Schools		1,085 70	
„ „ Government account		305 35	
Sundry sales		36 00	
Inventory, March 31, 1921—			
Nursery stock	$38,642 60		
Bees, etc.	561 00		
Vegetables in storage	8,207 85		
		47,411 45	
			$64,485 39

Expenses.

Salaries and upkeep		$ 3,941 50	
Board of employees		924 00	
Horse-labour		2,634 50	
Sundries		85 41	
Fertilizer		119 50	
		$ 7,704 91	
Crops from farm to nursery for distribution—			
Potatoes, 874,480 lb.		10,931 00	
Turnips, 12,400 lb.		62 00	
Onions, 47,500 lb.		197 95	
Cabbage, 32,878 lb.		657 56	
Swede turnips, 20,000 lb.		300 00	
		$19,853 42	
Inventory, March 31, 1920—			
Nursery stock	$35,851 40		
Bees	650 85		
Vegetables in storage	4,956 80		
		41,459 05	
			61,312 47
Profit			$ 3,172 92

CROP DEPARTMENT.

POTATOES—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Yield of crop,	58,414 lb. earlies, Field No. 5	$ 1,211 65	
„	1,263,228 lb., Field No. 5	16,309 71	
„	102,500 lb., Field No. 18	1,281 25	
			$18,802 61
Carried forward			$18,802 61

CROP DEPARTMENT—*Continued.*

POTATOES—PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$18,802 61
Expenses.		
To Fertilizer	$ 680 77	
Disking	618 50	
Manure and spreading	649 00	
Ploughing	465 75	
Seeding	932 34	
Rolling	131 40	
Cultivating	343 00	
Digging	190 25	
Hauling	604 00	
Clearing field	33 70	
		4,648 71
Profit		$14,153 90

Field No. 5 (earlies), 2.83 acres; Field No. 5, 37.40 acres; Field No. 18, 6.50 acres; total, 46.73 acres. Yield per acre, 15.23 tons; cost per ton, $6.53.

HAY—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.		
By Yield of hay, 235,000 lb., Field No. 3	$3,744 00	
„ green feed, 50,000 lb., Field No. 3	187 50	
„ green P.O.V., 20,000 lb., Field No. 3	75 00	
„ hay, 33,000 lb., Field No. 20	528 00	
		$ 4,534 50
Expenses.		
To Seed	$ 250 75	
Ploughing	13 60	
Seeding	16 00	
Manuring	21 20	
Rolling	4 50	
Cutting and hauling	366 50	
		672 55
Profit		$ 3,861 95

Fields Nos. 3 and 4, 41.4 acres; Field No. 20, 8 acres; total, 49.4 acres. Yield of hay per acre, 2.70 tons; cost per ton, $5.03.

ONIONS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.		
By Yield, 62,525 lb., Fields Nos. 6 and 7		$ 781 58
Expenses.		
To Ploughing	$ 11 20	
Rolling	2 60	
Manuring	35 20	
Seeding	85 00	
Cultivating	10 00	
Hauling	43 00	
		187 00
Profit		$ 594 58

Fields Nos. 6 and 7, 2.1 acres. Yield per acre, 14.90 tons; cost per ton, $5.98.

CROP DEPARTMENT—*Continued.*

MANGELS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Yield, 520,518 lb., Field No. 2		$ 2,609 59

Expenses.

To Ploughing	$ 98 00	
Manuring	157 98	
Disking	74 40	
Rolling	24 00	
Seeding	89 10	
Fertilizer	223 43	
Salt	75 00	
Cultivating	140 20	
Hauling	152 00	
		1,034 11
Profit		$ 1,575 48

Field No. 2, 12 acres. Yield per acre, 21.68 tons; cost per ton, $3.97.

TURNIPS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Yield, 471,200 lb., Field No. 5		$ 2,356 00

Expenses.

To Disking	$ 75 00	
Manuring	113 75	
Ploughing	47 50	
Fertilizer	104 98	
Lime	59 40	
Seed	24 00	
Cultivating	30 75	
Rolling	23 50	
Hauling	194 00	
		672 88
Profit		$ 1,683 12

Field No. 5. Yield per acre, 31.83 tons; cost per ton, $2.85.

CARROTS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Yield, 54,000 lb., Field No. 5		$ 270 00

Expenses.

To Disking	$ 21 50	
Manuring	33 25	
Fertilizer	24 51	
Ploughing	15 50	
Seed	7 50	
Cultivating	6 50	
Rolling	7 50	
Hauling	15 50	
		131 76
Profit		$ 138 24

Field No. 5, 2.2 acres. Yield per acre, 12.27 tons; cost per ton, $4.87.

CROP DEPARTMENT—*Continued.*

SEED-PEAS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By 3,440 lb.	$ 172 00	
30 bales of straw	27 00	
		$ 199 00

Expenses.

To Ploughing	$ 13 20	
Disking	10 50	
Seed	17 50	
Seeding	5 25	
Rolling	8 50	
Cutting	30 00	
Hauling	9 00	
		93 95
Profit		$ 105 05

Field No. 1, 3 acres. Yield per acre, 1,146 lb.; cost per ton, $54.60.

ENSILAGE—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Clover silage, 557,727 lb. at $7.50 a ton	$2,091 44	
Green feed, 60,000 lb. at $7.50 a ton	225 00	
Peas, oats, and vetches, 415,202 lb. at $7.50 a ton	1,557 00	
Corn, 578,815 lb. at $7.50 a ton	2,170 55	
		$ 6,043 99

Expenses.

To Seed	$ 412 47	
Seeding	66 85	
Manuring	261 02	
Ploughing	203 60	
Rolling	91 10	
Cultivating	375 75	
Cutting	401 50	
Hauling	408 80	
Sundries	12 55	
		2.233 64
Profit		$ 3,810 35

Field No. 8, 18 acres clover; Field No. 1, 22¼ acres peas, oats, and vetches, 16 acres corn. Yield per acre, 14.32 tons; cost per ton, $2.77.

SWEDE TURNIPS AND CABBAGE—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By 32,878 lb. cabbage at 2 cents		$ 657 56
20,000 lb. turnips at 1½ cents		300 00
		$ 957 56

Expenses.

To Disking sod	$ 42 50	
Ploughing	48 80	
Car of manure and hauling	114 40	
		205 70
Profit		$ 751 86

Field No. 17, 3.3 acres.

CROP DEPARTMENT—*Continued.*

OATS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Production.

By Yield of oats, 261,998 lb. at $45 per ton	$7,859 94	
„ ensilage, 85,145 lb. at $7.50 per ton	319 29	
„ straw, 986 bales at 90 cents per bale	887 40	
		$ 9,066 63

Expenses.

To Ploughing	$ 825 40	
Rolling	154 75	
Lime and fertilizer	179 71	
Manuring	434 40	
Seed	650 45	
Seeding	172 40	
Disking and cultivating	503 85	
Cutting	442 50	
Hauling	557 70	
Binder-twine, etc.	244 48	
		4,165 64
Profit		$ 4,900 99

Fields Nos. 6 and 7, 42.4 acres; Field No. 8, 42 acres; Hill, 4 acres; Wilson Ranch, 26.1 acres; total, 114.5 acres. Yield of threshed oats per acre, 2,290 lb.; cost per ton, $22.59.

PASTURAGE ACCOUNT, COLONY FARM.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

By General Herd Account	$ 376 00	
Young cattle	33 00	
Sheep Account	140 00	
Brood Mares Account	100 00	
		$ 649 00

Expenses.

To Uphill seed	$ 159 10	
W.R. seed	217 75	
Fertilizer	59 58	
		436 43
Profit		$ 212 57

SHRINKAGE AND ROT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Loss.

Hay, 39,505 lb.	$ 530 99
Potatoes, 81,452 lb.	986 52
Roots, 173,131 lb.	681 97
Onions, 32,770 lb.	408 30
Loss	$ 2,607 78

TRACTOR ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

By 763½ hours' work at $2.50		$ 1,908 75

Expenses.

To 20 per cent. cost of tractor written off		$ 350 00	
Operating expenses—			
Salary	$ 422 50		
Board	216 00		
Gasolene and oil	1,001 33		
Repairs	287 61		
Sundry	46 20		
		1,973 64	
			2,323 64
Loss			$ 414 89

PRIZE-MONEY ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Receipts.

American Holstein Friesian Association	$ 134 25
Premium on Holstein Friesian Association	13 42
Canadian Holstein Friesian Association R.O.M.	16 00
" " " R.O.P.	85 00
" " " R.O.P.	15 00
Profit	$ 263 67

EXHIBITION EXPENSES.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Expenses.

Freight	$ 47 50
Employees' transportation, board, etc.	487 29
Sundries	29 94
Loss	$ 564 73

GENERAL EXPENSES OF MAINTENANCE AND ADMINISTRATION.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1921.

Expenses.

To Salaries and vouchers	$13,549 71
Milk supplied to employees	662 61
Board supplied to employees	2,122 00
Horse-labour	1,080 00
Coal	1,187 26
Uniforms	356 40
Sundries	302 91
Loss	$19,260 89

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.

ESSONDALE INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1921.

Dairy produce—		
Milk, 305,810.6 lb.	$18,348 54	
Milk, employees, 54,580 lb.	3,274 80	
Butter, 2,269 lb.	1,474 83	
Buttermilk, 488 lb.	9 76	
Cream, 461 lb.	138 29	
		$23,246 22
Nursery produce—Vegetables, etc.		16,272 36
Meats—		
Veal, 772 lb.	$ 169 84	
Beef, 6,236 lb.	1,060 12	
Mutton and lamb, 6,442 lb.	1,610 50	
Dressed poultry, 2,063½ lb.	905 96	
Pork, 23,676 lb.	5,856 38	
		9,602 80
Eggs, 5,942 dozen		3,173 65
Horse-labour, 1,588⅘ hours		794 40
Sundries—Straw, etc.		61 80
Total		$53,151 23

ESSONDALE INSTITUTION—TREES AND SHRUBS SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1921.

Trees planted on airing-court	$ 301 00
Tress planted on Hospital grounds	84 00
Total	$ 385 00

NEW WESTMINSTER INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1921.

Dairy produce—		
Milk, 168,641 lb.	$10,118 46	
Cream, 912½ lb.	273 75	
Buttermilk, 799 lb.	15 98	
		$10,408 19
Nursery produce—Vegetables, etc.		4,128 83
Meats—		
Beef, 1,319 lb.	$ 224 23	
Mutton and lamb, 1,949 lb.	487 25	
Dressed poultry, 59 lb.	16 52	
Pork, 14,379 lb.	3,653 01	
		4,381 01
Incidentals—Horse-labour, etc.		3,317 00
Sundries—Fertilizer, etc.		271 06
Total		$22,506 09

SAANICH INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1921.

2 brood sows	$ 200 00
108 lb. veal (half-cost)	10 80
30 Leghorn pullets	82 50
Total	$ 293 30

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

BOYS' INDUSTRIAL SCHOOL.

Supply Account, March 31st, 1921.

Hauling gravel, etc.	$ 19 00
5,000 lb. hay	80 00
Blacksmith Account	426 75
Total	$ 525 75

ACCOUNTS RECEIVABLE.

Sundry amounts outstanding, March 31st, 1921	$ 1,493 87

NOTES RECEIVABLE.

Sundry notes outstanding, March 31st, 1921	$ 2,009 57

REMITTANCE TO TREASURY, MARCH 31ST, 1921.

Sundry amounts received for sale of stock	$ 8,422 10

TREES, SHRUBS, AND PLANTS SUPPLIED TO PUBLIC SCHOOLS, MARCH 31ST, 1921.

Central School, Port Coquitlam	$ 123 30
Herbert Spencer, New Westminster	24 00
Hospital, New Westminster	48 40
Naramata School	150 50
Point Grey School	249 80
Rosedale School	204 90
Kelowna School	147 00
Murrayville School	4 00
Cranbrook School	60 00
Vernon School	16 20
Port Coquitlam School	57 60
Total	$ 1,085 70

STOCK SUPPLIED ON GOVERNMENT ACCOUNT, MARCH 31ST, 1921.

District Superintendent of Agriculture, Chilliwack	$ 38 40
" " " Cloverdale	20 00
" " " Burquitlam	23 60
Government Agent, New Westminster	15 00
Girls' Industrial School	256 35
Total	$ 353 35

INVENTORY OF COWS, MARCH 31ST, 1921.

Name.	Reg. No.	Amount.
Koba DeKol	21672	$ 200 00
Zarilda Clothilde 3rd DeKol	14887	125 00
Ena Netherland DeKol 2nd	14666	100 00
Colony Alma Korndyke	26311	300 00
Colony Beulah DeKol Korndyke	26314	250 00
Colony DeKol Queenie Rag	26320	400 00
Colony Lady Aaggie Newman	25926	125 00
Colony Fayne Canary	30128	600 00
Colony Beulah Pauline Korndyke	30131	650 00
Carried forward		$ 2,750 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF COWS—*Continued.*

Name.	Reg. No.	Amount.
Brought forward		$ 2,750 00
Colony Jemima Wayne 2nd	30134	125 00
Colony Sadie Canary	30137	800 00
Colony Maud Colantha	52360	400 00
Colony Georgie Korndyke	32361	300 00
Morag Veeman DeKol	31643	500 00
Dierdre Douglass Segis	31842	550 00
Colony Princess Korndyke	36013	100 00
Colony Poetess Korndyke 2nd	36012	450 00
Colony Contest Segis	36020	400 00
Colony Poetess Korndyke (at Colquitz)	36011	300 00
Colony Sena Newman	36010	200 00
Colony Aaggie Pietertje	31774	500 00
Colony Koba Segis	38770	500 00
Colony Cora Cornucopia	36008	500 00
Colony Poetess Segis	38771	350 00
Colony Beets Newman	38776	600 00
Colony Alma Segis	36017	100 00
Colony Vrouka Segis	36019	400 00
Colony Beets Segis	36014	150 00
Effie Cornucopia DeKol	37289	250 00
Yvonnie Cornucopia Segis (at Colquitz)	37287	250 00
Colony Ena Butter Girl	41644	350 00
Colony McKinley Canary	41646	125 00
Colony Korndyke Belle	38767	450 00
Colony Butter Lass	41645	400 00
Colony Aaggie McKinley	41647	125 00
Colony Queenie Rag Segis	41652	300 00
Colony Ianthe Newman	41642	400 00
Colony Vrouka Pride	41643	125 00
Colony Netherland Segis Clothilde	42889	500 00
Colony Minnie Segis	41653	400 00
Colony Faforit McKinley	42884	200 00
Colony Lakeside McKinley	44629	450 00
Lulu Posch 3rd	216921	500 00
Colony Korndyke Newman (at Colquitz)	50284	400 00
Colony Canary Butter Girl	42888	250 00
Colony Beets Cornucopia	44630	175 00
Wimple Westport Posch	61051	200 00
Wimple Netherland Westport	76901	400 00
Colony Bessie McKinley	52831	350 00
Colony Farforit Segis	52829	500 00
Colony McKinley Beulah	52828	400 00
Segis Elsie Posch	44320	300 00
Madam Bessie Posch	25833	500 00
Colony Grabegga McKinley	60945	300 00
Colony Clothilde DeKol	38772	500 00
Colony Maud McKinley	50286	500 00
Colony Canary McKinley	50292	500 00
Colony Wayne McKinley	50289	500 00
Colony Beulah McKinley	52833	500 00
Colony Nathalie McKinley	50288	450 60
Colony Grebagga DeKol	54084	446 12
Carried forward		$21,971 72

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF YOUNG CATTLE—*Continued.*

Name.	Reg. No.	Amount.
Brought forward		$21,971 72
Colony Daisy McKinley	52834	359 70
Colony Segis McKinley	52835	1,000 00
Colony Ena McKinley	56864	367 80
Colony Rag Valdessa	56868	470 90
Colony Poetess Valdessa	56862	470 90
Colony Ena DeKol McKinley	60946	348 00
Colony Sylvia Newman	60943	125 00
Colony Maud Newman	60944	342 20
Colony Marie Tensen McKinley	63026	125 00
Colony Ianthe McKinley	62389	400 60
Colony Belle Valdessa	63025	393 85
Colony Faforit Newman	67855	356 45
Colony Sena Ormsby	71114	281 80
Colony Abbekerk Ormsby	70845	271 60
Beaverland Lady Pauline	74111	500 00
Beaverland Pietje Posch	74113	500 00
Thorndale Elsie Wayne	38380	350 00
Pearl Nechtilde of Beaverland	31968	300 00
S.C.P. Rag Apple Lottie	69568	275 00
S.C.P. Fayne Calamity	59662	350 00
S.C.M. Ella Nechthilde	50277	400 00
Total		$29,960 52

INVENTORY OF YOUNG CATTLE.

Name.	Reg. No.	Amount.
Colony Vale Korndyke Newman, 29 months old	63024	$ 391 94
Colony Clothilde Newman, 28 months old	67850	377 98
Colony Cora McKinley, 28 months old	67856	377 98
Colony Lakeside Newman, 27 months old	67851	374 12
Colony Yvonne McKinley, 27 months old	67858	374 12
Colony Vrouka Newman, 25½ months old	67853	353 28
Colony Lade Ormsby, 23 months old	71112	308 78
Colony Morag Ormsby, 23 months old	71115	308 78
Colony Fleta Newman, 22¼ months old	70850	301 43
Colony Marie Newman, 20½ months old	71111	274 18
Colony Cyclone Ormsby, 20½ months old	70844	274 18
Colony Beulah P. Newman, 17¼ months old	70848	239 11
Colony Fayne Ormsby, 19 months old	70843	263 34
Colony Lord Aaggie Champion, 17¼ months old	43555	239 11
Colony Jannek Ormsby, 16 months old	75673	221 76
Colony Schuiling Ormsby, 15½ months old	75672	214 78
Colony Mercedes Newman, 15 months old	43553	207 80
Colony Zarilda Ormsby, 14¾ months old	80505	194 51
Colony Countess Ormsby, 14½ months old	75670	187 53
Colony M. Poetess McKinley, 14¼ months old	75674	184 04
Colony Faforit Ormsby, 13¼ months old	80511	183 67
Colony Effie Ormsby, 13 months old	80514	180 18
Colony Aldyke McKinley, 12½ months old	45858	173 30
Colony Major Newman, 12¼ months old	45859	173 30
Carried forward		$ 6,379 20

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

.... INVENTORY OF YOUNG CATTLE—*Continued.*

Name.	Reg. No.	Amount.
Brought forward		$ 6,379 20
Colony Sadie Vale Champion, 12¼ months old	45863	169 81
Colony Posch Champion, 12¼ months old	45866	169 81
Colony Aaggie Ormsby, 12 months old	80509	166 32
Colony P.S. Segis, 12 months old	80507	166 32
Colony P.S. McKinley, 12 months old	80508	166 32
Colony Grebegga Valdessa, 29 months old	62388	401 94
Colony Jemima Newman, 11¾ months old	80513	162 86
Colony Vrouka Segis Newman, 11¾ months old	80504	162 86
Colony Chief Champion, 10¾ months old	45864	149 00
Colony Beets Perfection, 10½ months old	80510	145 53
Colony Wayne Perfection, 10¼ months old	80506	142 07
Colony McKinley Perfection, 8¾ months old	48007	121 28
Colony Alma Korndyke Newman, 8 months old	86419	110 88
Colony Sir McKinley Newman, 7¾ months old	48008	107 42
Colony Prince McKinley, 7½ months old	48009	103 95
Colony Tensen Newman, 7¼ months old	86417	100 48
Colony Colanthus Newman, 7 months old	48012	97 02
Colony Grebegga Pauline, 6½ months old	86416	90 09
Colony Victoria Pauline, 6¼ months old	86415	86 62
Colony Moderation Newman, 5¼ months old	48011	72 77
Colony Morag McKinley, 5¼ months old	86420	72 77
Colony Lady Pauline, 4½ months old	86418	62 37
Colony Lakeside Posch, 4¼ months old	48013	58 90
Colony Lord Posch, 4¼ months old	.....	58 90
Colony Mabel Newman, 4 months old	.....	55 44
Colony Canary Fayne McKinley, 2¼ months old	.....	31 19
Colony Clare McKinley, 2 months old	.....	27 72
Colony Bos McKinley, 2 months old	.....	27 72
Colony Albino Posch, 1½ months old	.....	20 79
Colony Aaggie Mack Pauline, 1¼ months old	.....	17 33
Colony Friend McKinley, 1¼ months old	.....	17 33
Colony Beaverland Prince, 1 month old	.....	13 86
Colony Cornelia's Posch, ¾ month old	.....	10 40
Colony Wimple McKinley, ½ month old	.....	6 93
Colony Pietje Ormsby, ½ month old	.....	6 93
Beaverland Pietje Pauline, 19½ months old	81218	270 32
Beaverland Pretty Lade, 23 months old	74110	318 78
Beaverland Grace Posch, 22½ months old	74108	304 22
Beaverland Canary Pauline, 19½ months old	74109	270 32
Beaverland Julia Pauline, 13 months old	80649	180 00
Beaverland Grace Pauline, 12 months old	80647	165 32
Total		$11,270 09

INVENTORY OF HERD BULLS, MARCH 31ST, 1921.

Name.	Reg. No.	Amount.
Aaggie Cornucopia Newman	14981	$ 1,000 00
Colony McKinley Segis DeKol	20031	250 00
Colony Prince Posch Paul	16951	750 00
Colony Perfection Valdessa (half-interest)	34653	109 65
Total		$ 2,109 65

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF WORK-HORSES, MARCH 31ST, 1921.

Name.	Amount.
Donald (roan gelding), 15 years old	$ 300 00
Prince (bay gelding), 7 years old	350 00
Colony Pride (Scotty), 7 years old	400 00
Billy (McCallum), 5 years old	300 00
Barney (bay gelding), 5 years old	350 00
Jock (bay gelding), 6 years old	350 00
Forage Heroine (Shire), 12 years old	400 00
Bramhope Emerald (Shire), 14 years old	400 00
Dunrobin Doris (Clyde mare), 14 years old	400 00
Belle (brown mare), 12 years old	175 00
Pete or Sharp (gelding), 13 years old	150 00
Doll (grey mare), 12 years old	200 00
Sandy (gelding), 14 years old	150 00
Colony Mintmaster (gelding), 3 years old	400 00
McCallum (chestnut driver), 15 years old	125 00
Jerry 2nd No. 6 (gelding), 7 years old	350 00
Levi (express), 17 years old	225 00
Repertoire (pony), 19 years old	85 00
Doctor (buckskin), transferred to grade, 9 years old	180 00
Colony Forrest Queen, transferred to New Westminster, 3 years old	180 00
Colony Jean, transferred to Saanich, 6 years old	250 00
Joe (grade)	300 00
Jimmy 1st (grade)	175 00
Roan mare and horse Dan, purchased from J. Knowles	425 00
Reg. Clyde mare purchased from D. E. McKay	375 00
Reg. Clyde mare purchased from J. Hanbury	350 00
Total	$ 7,345 00

INVENTORY OF BROOD MARES, MARCH 31ST, 1921.

Name.	Reg. No.	Amount.
Nerissa	28025	$ 5,000 00
Peggy Pride	28023	3,500 00
Colony Lady Begg	28940	2,000 00
Opal	28942	2,000 00
Colony Melita Dunure	33387	661 32
Colony Opal	34132	550 35
Colony Baroness	37585	256 83
Total		$13,968 50

INVENTORY OF YOUNG HORSES, MARCH 31ST, 1921.

Name.	Reg. No.	Amount.
Colony Lady Durure, 23½ months old	45438	$ 956 50
Colony Lady Pride, 22¼ months old	45440	898 00
Colony Drumburle Prince, 11¾ months old	.....	497 00
Colony King, 8¾ months old	.....	362 00
Colony Begg Princess, 8¼ months old	.....	357 87
Colony Opal's Queen, 8¾ months old	.....	362 00
Total		$ 3,433 37

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF STALLION, MARCH 31ST, 1921.

Name.	Reg. No.	Amount.
Colony Everlasting Favourite	21127	$ 1,000 00

INVENTORY OF SHEEP, MARCH 31ST, 1921.

Oxford Downs (pure-bred)—	
26 aged ewes	$ 650 00
12 shearling ewes	240 00
1 aged ram	100 00
7 shearling rams	140 00
Grade flock—	
36 aged ewes	540 00
11 shearling ewes	187 00
3 shearling wethers	54 00
Total	$ 1,911 00

INVENTORY OF POULTRY DEPARTMENT, MARCH 31ST, 1921.

236 Leghorn hens at $2.25	$ 531 00
279 „ pullets at $2.50	697 50
119 R.I. Reds at $2.60	309 40
29 Orpingtons at $2.60	75 40
10 cockerels at $5	50 00
100 baby chicks at 60 cents	60 00
110 „ at 45 cents	49 50
165 „ at 35 cents	57 75
Eggs in incubators	35 00
22 dozen eggs on hand at 32 cents	7 04
Total	$ 1,872 59

Feed on Hand.

750 lb. cracked corn at $58 per ton	$ 21 75
1,000 „ whole oats at $43 per ton	21 50
700 „ wheat at $74 per ton	25 90
900 „ bran at $42 per ton	18 90
800 „ shorts	16 80
800 „ ground oats at $45 per ton	18 00
300 „ shelling at $18 per ton	2 70
90 „ beef-scraps at $190 per ton	8 55
150 „ chick-feed at $85 per ton	6 37
Total	$ 140 47

INVENTORY OF HOGS, ESSONDALE, MARCH 31ST, 1921.

39 hogs, weight about 6,407 lb. at 13 cents	$ 864 95

INVENTORY OF HOGS, NEW WESTMINSTER, MARCH 31ST, 1921.

15 sows at $100	$ 1,500 00
30 hogs, 8–9 months old, at $36	1,080 00
35 „ 6–7 months old, at $30	1,050 00
25 „ 4–6 months old, at $20	500 00
35 „ 4–6 weeks old, at $7	245 00
2 boars, $125, $100	225 00
Total	$ 4,600 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF FEED AND PRODUCE, MARCH 31ST, 1921.

1,075 lb.	beans	$ 107 50
4,280 „	peas	214 00
61,393 „	oats	1,840 83
42,275 „	barley	1,158 30
4,405 „	hay	73 08
655,889 „	ensilage	2,459 53
334 bales	straw	298 01
2,500 lb.	soy-bean meal	77 00
155,337 „	potatoes	1,974 47
476,468 „	roots	2,389 32
2,000 „	gluten	72 00
2,865 „	alfalfa	44 77
5,760 „	onions	72 02
11,400 „	bran	270 95
Total		$11,051 78

NURSERY AND GARDEN INVENTORIES, MARCH 31ST, 1921.

Deciduous trees		$11,845 00
Shrubs and small trees		6,000 40
Evergreen trees and shrubs		5,636 50
Climbing plants		408 00
Reeds and grasses		368 00
Herbaceous perennials		1,602 40
Conifers and evergreens		1,474 35
Young stock trees and shrubs		228 75
Seedlings, 2, 3, and 4 years		827 55
Fruit and ornamental trees—		
Apple	$ 27 00	
Prunes	43 00	
Pyrus	32 10	
Crataegus	165 00	
		267 10
Orchard—		
Plums	$ 479 00	
Cherries	240 00	
Pears	484 00	
Apples	2,354 00	
		3,557 00
Bush and small fruits—		
Black currant	$3,356 00	
Red currant	584 00	
Gooseberries	530 50	
Raspberries	341 25	
Strawberries	1,615 80	
		6,427 55
Bees, etc.		561 00
Vegetables in storage		8,207 85
Total		$47,411 45

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

SECOND REPORT

OF

THE PROHIBITION COMMISSIONER

FOR THE

YEAR ENDING DECEMBER 31ST

1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

To His Honour WALTER CAMERON NICHOL,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PEASE YOUR HONOUR:

The undersigned has the honour to submit herewith the Report under the "Prohibition Act" for the year ended December 31st, 1920.

J. W. DE B. FARRIS,

Attorney-General.

March 1st, 1921.

Office of the Prohibition Commissioner,

Victoria, B.C., February 9th, 1921.

The Honourable J. W. de B. Farris, K.C.,

Attorney-General, Victoria, B.C.

Sir,—I have the honour to submit my report under section 56 of the "British Columbia Prohibition Act" for the year ended December 31st, 1920.

I have the honour to be,

Sir,

Your obedient servant,

A. H. WYLLIE,

Prohibition Commissioner.

BRITISH COLUMBIA PROHIBITION ACT.

REPORT BY THE COMMISSIONER.

(1.) Liquor Sales.

The total daily sales at Government Liquor Vendors' Stores and Government Liquor Warehouse during the year 1920 amounted to $909,884.18. Appendix No. 1 shows the sales in detail.

(2.) Prosecutions.

A statement of prosecutions made throughout the Province during the year 1920 for infractions of the Act is shown in Appendix No. 2.

According to the records of this Department, there has been an increase of 931 prosecutions or 103.9 per cent. during the year 1920 over the year 1919, and for comparative purposes the following statement has been compiled showing the years 1919 and 1920:—

List of Prosecutions—

	1919.	1920.
For selling liquor	89	360
Illegal possession of liquor	663	1,318
Against doctors	9	4
Against druggists	5	2
Against breweries	11	2
Against liquor companies	..	5
General infractions of Act	51	136
Not stated	68	...
	896	1,827
Number of convictions	805	1,691
Number of cases dismissed	91	136

Fines and forfeitures—	1919.	1920.
Total amount of fines imposed	$54,659 00	$166,863 75
Bail forfeited	5,650 00	17,575 00
Bonds estreated	9,000 00	2,465 00
	$69,309 00	$186,903 75

Sentences—		
Sentences imposed without option of fine	50	47
Total duration of above	29¼ years.	22¼ years.

(3.) Confiscated Liquor.

Appendix No. 3 shows the net value of liquor which has been confiscated to the Crown and forwarded to the Government Liquor Warehouse in Vancouver.

This Department experienced great difficulty in obtaining possession of liquor which had been confiscated to the Crown in certain cities and municipalities, and the right to ownership by the Provincial Government challenged. Several cities and municipalities refused to hand over confiscated liquor to the Government, and in order to settle this point action was taken against the City of New Westminster as a test case. Judgment was handed down by Mr. Justice Morrison in the Supreme Court of British Columbia in favour of the Government, thus disposing finally as to the rightful ownership of liquor after confiscation.

The net value of confiscated liquor from all sources received and taken into stock by this Department during 1920 is $10,682.81. Since the end of December this figure has been considerably increased by consignments of liquor from cities and municipalities which had been holding same pending the result of the test case Rex *versus* the City of New Westminster.

The approximate value of the liquor which has been confiscated to the Crown and being held by this Department subject to litigation is $172,089.34.

A considerable quantity of liquor which was unfit for consumption has been destroyed by Chief Constables in the presence of witnesses on instructions from this Department, and certificates of destruction have been obtained in each case.

A quanity of confiscated liquor has also been destroyed by the Manager of the Government Liquor Warehouse in Vancouver. This liquor was forwarded by various Chiefs of Police, and on testing same on arrival it was found to be unfit for consumption. This liquor was destroyed in the presence of several witnesses, including a Provincial constable on each occasion, a certificate of destruction being rendered in every case.

(4.) GENERAL INFORMATION.

(1.) *Hospital Permits.*—During the year 1920, 117 permits were issued to hospitals throughout the Province, fixing the quantity of liquor and alcohol to be held at any one time for the use of the patients therein under the provisions of subsection (2) of section 14.

(2.) *Industrial and Steamship Permits.*—Subsection (2*a*) of section 14 of the Act was repealed at the last session of the Legislature, and all permits issued during the early part of the year under this section expired on March 31st and no further permits were issued; 173 permits were issued between January 1st and March 8th, 1920.

(3.) *Mechanical, Manufacturing, and Scientific Permits.*—The number of permits issued under subsection (3) of section 7 during 1920 was sixty-one.

(4.) *Liquor and Alcohol for Manufacturing.*—The number of permits issued under subsection (9) of section 14 was 329. A very great proportion of these permits was issued to druggists, barbers, etc., for the manufacture of pharmaceutical preparations, toilet preparations, etc., and particular care has been exercised in seeing that this privilege has not been abused.

(5.) *Physicians' Prescriptions for Liquor.*—A statement showing the number of prescriptions for liquor and alcohol issued by physicians and honoured at Government Vendors' Liquor Stores and drug-stores throughout the Province is shown in Appendix No. 4.

A great reduction in the number of prescriptions so honoured is observed in the month of June. This reduction was occasioned by an amendment to subsection (3) of section 14, which came into effect on June 1st, 1920, and restricted the number of prescriptions a physician could issue to 100 in any one month, and the quantity of liquor that could be prescribed to 8 oz. and to 16 oz. for persons living more than 5 miles from the nearest drug-store vending liquor, except under special circumstances, when an affidavit is required, as provided.

All prescriptions for liquor honoured at Government Vendors' Stores during the year have been forwarded to my office, where same have been checked and tabulated. Prescriptions honoured at drug-stores throughout the Province have been forwarded to my office in accordance with the amendment to subsection (1) of section 14 of the Act, and have also been checked and tabulated.

(6.) *Liquor Warehouses under Section 19 of the Act.*—The Dominion Order in Council prohibiting the importation of liquor into Canada was lifted on January 1st, 1920, with the result that a number of export liquor warehouses were established in various parts of the Province under section 19 of the Act. The quantity of liquor imported by these warehouses has been very considerable, as is shown in Appendix No. 5, the information given therein being obtained from the weekly reports rendered to this Department by each warehouse. Thirty-eight export liquor warehouses were established under section 19 of the Act during the year, and on December 31st, 1920, there were twenty-seven warehouses in operation. In every instance notification was sent to the Chief of Police of the city in which an export liquor warehouse was established, so that its conduct and operations could be held under observation from the beginning.

Five actions were taken against export liquor warehouses operating under this section, and in three instances the entire stocks of liquor were confiscated to the Crown.

(7.) *Purchase and Supply of Liquor for Government Stores.*—The purchase of all liquor for sale by this Department has been made by the Government Purchasing Agent upon requisitions which have been previously approved by the Commissioner.

Every effort has been made to obtain the finest standard brands of liquor placed in the Government Liquor Stores for sale, and it may be said that no serious complaint has ever reached this Department in regard to the quality of the liquor sold.

Appendix No. 6 shows the quantities of liquor purchased and received into stock (including confiscated liquor) during the year 1920.

APPENDICES.

APPENDIX No. 1.

SUMMARY OF DAILY SALES MADE BY THE GOVERNMENT LIQUOR VENDORS THROUGHOUT THE PROVINCE OF BRITISH COLUMBIA DURING THE YEAR 1920.

Month.	Vancouver.	Victoria.	Nanaimo.	Prince Rupert.	Quesnel.	Telegraph Creek.	Warehouse.
January	$145,972 25	$ 33,838 00	$ 4,275 75	$ 3,070 15	.....	.....	$ 208 00
February	119,693 79	33,226 00	3,251 35	3,547 15	.....	.....	62 50
March	127,504 73	31,738 30	4,474 90	3,305 19	$105 00	.....	3,191 22
April	92,646 25	22,467 65	3,457 20	2,729 03	40 15	.....	215 05
May	114,224 71	26,705 00	5,884 35	3,188 87	.....	.....	417 00
June	12,557 01	4,238 45	383 10	988 87	.....	.....	2,881 01
July	8,302 63	2,326 59	84 70	202 86	.....	.....	80 50
August	9,643 01	2,200 62	65 45	391 39	.....	$ 27 50	532 00
September	10,849 04	2,461 52	39 20	283 13	.....	32 25	153 25
October	12,869 32	2,415 17	51 10	281 56	.....	32 25	2,149 50
November	12,744 63	3,240 53	35 20	389 91	.....	22 50	1,181 90
December	20,070 22	5,181 15	91 80	711 42	.....	13 50	218 90
Totals..	$687,077 59	$170,038 98	$22,094 10	$19,089 53	$145 15	$128 00	$11,290 83

Total sales for year, $909,884.18.

APPENDIX No. 2.

STATEMENT OF PROSECUTIONS BROUGHT UNDER THE "BRITISH COLUMBIA PROHIBITION ACT" DURING THE YEAR 1920.

Cities.

Place.	Prosecutions.	Total No. Convictions.	Charges Dismissed.	Sentenced without Option.	Amount in Fines.	Bail forfeited.	Bonds estreated.	Total in Fines and Forfeitures.
Alberni	...	...	..	..	.....	.....	.....	.....
Armstrong	1	...	1	..	.....	.....	.....	.....
Chilliwack	10	9	1	..	$ 700 00	$ 250 00	.....	$ 950 00
Courtenay	9	8	1	..	650 00	.....	.....	650 00
Cranbrook	35	33	2	1	2,785 00	.....	.....	2,785 00
Cumberland	6	6	..	..	340 00	.....	.....	340 00
Duncan	9	9	..	..	1,115 00	.....	.....	1,115 00
Enderby	...	...	..	..	.....	.....	.....	.....
Fernie	26	26	..	..	3,685 00	.....	.....	3,685 00
Grand Forks	3	3	..	..	150 00	.....	.....	150 00
Greenwood	...	...	..	..	.....	.....	.....	.....
Kamloops	77	76	1	1	10,149 00	.....	.....	10,149 00
Kaslo	...	...	..	..	.....	.....	.....	.....
Kelowna	...	...	..	..	.....	.....	.....	.....
Ladysmith	2	2	..	..	100 00	.....	.....	100 00
Merritt	6	6	..	..	625 00	.....	.....	625 00
Nanaimo	22	21	1	1	2,957 00	.....	.....	2,957 00
Nelson	20	15	5	1	1,278 95	.....	.....	1,278 95
New Westminster..	50	52	1	..	5,017 00	650 00	.....	5,667 00
North Vancouver..	15	14	1	..	1,511 00	.....	.....	1,511 00
Port Alberni	1	1	..	..	50 00	.....	.....	50 00
Port Coquitlam	...	...	..	..	.....	.....	.....	.....
Port Moody	2	2	..	..	100 00	.....	.....	100 00
Prince George	46	38	8	1	4,762 50	150 00	.....	4,912 50
Prince Rupert	88	87	1	6	11,404 50	.....	.....	11,404 50
Revelstoke	6	6	..	..	470 00	.....	.....	470 00
Rossland	10	9	1	..	1,500 00	.....	.....	1,500 00
Salmon Arm	2	2	..	..	100 00	.....	.....	100 00
Slocan	...	...	..	..	.....	.....	.....	.....
Trail	15	14	1	..	1,901 30	.....	.....	1,901 30
Vancouver	740	693	47	17	67,950 00	16,375 00	$2,100 00	86,425 00
Vernon	14	14	..	..	1,025 00	.....	.....	1,025 00
Victoria	96	90	6	3	8,980 00	.....	100 00	9,080 00
Totals...	1,314	1,236	78	31	$129,306 25	$17,425 00	$2,200 00	$148,931 25

APPENDIX No. 2—*Continued.*

STATEMENT OF PROSECUTIONS BROUGHT, ETC.—*Continued.*

Municipalities.

Place.	Prosecutions.	Total No. Convictions.	Charges Dismissed.	Sentenced without Option.	Amount in Fines.	Bail forfeited.	Bonds estreated	Total in Fines and Forfeitures.
Burnaby	19	17	2	..	$ 1,590 00	.....	.....	$ 1,590 00
Chilliwack	5	5	..	..	600 00	$100 00	.....	700 00
Coldstream	...	...	..	..	.....	.....	.....	.....
Coquitlam	...	...	..	..	.....	.....	.....	.....
Delta	8	7	1	..	350 00	.....	.....	350 00
Esquimalt	1	...	1	..	.....	.....	.....	.....
Fraser Mills	1	1	..	..	50 00	.....	.....	50 00
Kent	1	1	..	..	75 00	.....	.....	75 00
Langley	3	3	..	..	625 00	.....	.....	625 00
Maple Ridge	...	...	..	..	.....	.....	.....	.....
Matsqui	...	...	..	..	.....	.....	.....	.....
Mission	...	...	..	..	.....	.....	.....	.....
North Cowichan	...	...	..	..	.....	.....	.....	.....
North Vancouver	2	2	..	..	375 00	.....	.....	375 00
Oak Bay	5	3	2	..	550 00	.....	.....	550 00
Peachland	...	...	..	..	.....	.....	.....	.....
Penticton	32	29	3	1	2,150 00	50 00	$115 00	2,315 00
Pitt Meadows	...	...	..	..	.....	.....	.....	.....
Point Grey	12	13	..	..	955 00	.....	.....	955 00
Richmond	13	13	..	..	660 00	.....	.....	660 00
Saanich	12	10	2	..	1,400 00	.....	.....	1,400 00
Salmon Arm	...	...	..	..	.....	.....	.....	.....
South Vancouver	18	13	5	..	960 00	.....	100 00	1,060 00
Spallumcheen	...	...	..	..	.....	.....	.....	.....
Sumas	...	...	..	..	.....	.....	.....	.....
Summerland	...	...	..	..	.....	.....	.....	.....
Surrey	40	40	..	3	3,435 00	.....	.....	3,435 00
West Vancouver	...	...	..	..	.....	.....	.....	.....
Totals...	172	156	16	4	$13,775 00	$150 00	$215 00	$14,140 00

Provincial Police Districts.

Boundary District	17	17	..	..	$ 1,575 00	.....	.....	$ 1,575 00
Fort George „	36	18	18	2*; 1†	1,450 00	.....	.....	1,450 00
Fort St. John „	4	3	1	..	300 00	.....	.....	300 00
Hazelton „	7	7	..	..	400 00	.....	.....	400 00
Kamloops „	26	26	..	..	1,650 00	.....	$50 00	1,700 00
N.E. Kootenay „	10	6	4	..	550 00	.....	.....	550 00
S.E. Kootenay „	55	51	4	1‡; 1§	4,025 00	.....	.....	4,025 00
W. Kootenay „	35	34	1	2*	3,682 50	.....	.....	3,682 50
Lillooet „	43	37	6	3*	2,600 00	.....	.....	2,600 00
Nanaimo „	40	34	6	..	2,800 00	.....	.....	2,800 00
Prince Rupert „	26	25	1	..	1,475 00	.....	.....	1,475 00
Vancouver „	22	22	..	1‡	2,200 00	.....	.....	2,200 00
Vernon „	5	5	..	..	250 00	.....	.....	250 00
Victoria „	3	3	..	..	150 00	.....	.....	150 00
Yale „	12	11	1	1‡	675 00	.....	.....	675 00
Totals...	341	299	42	12	$23,782 50	.....	$50 00	$23,832 50

* Six months. † Twelve months. ‡ Thirty days. § Sixty days.

APPENDIX No. 3.

STATEMENT SHOWING PRESCRIPTIONS FOR LIQUOR ISSUED BY PHYSICIANS AND HONOURED AT GOVERNMENT LIQUOR VENDORS' STORES AND DRUG-STORES THROUGHOUT THE PROVINCE DURING THE YEAR 1920.

Month.	Vancouver.	Victoria.	Outside.	Totals.
January	15 654	4,238	7,250	27,142
February	13,333	4,146	7,205	24,684
March	13,071	3,508	7,051	23,630
April	9,286	2,411	5,142	16,839
May	11,727	2,838	5,750	20,315
June	1,758	511	1,252	3,521
July	1,449	464	1,379	3,292
August	1,930	441	1,495	3,866
September	2,069	480	1,508	4,057
October	1,855	466	1,698	4,019
November	2,176	499	1,589	4,264
December	3,037	703	1,688	5,428
Totals	77,345	20,705	43,007	141,057

STATEMENT OF PRESCRIPTIONS FOR LIQUOR ISSUED BY PHYSICIANS AND HONOURED BY GOVERNMENT LIQUOR VENDORS AND DRUGGISTS THROUGHOUT THE PROVINCE DURING THE YEAR 1920.

Victoria Physicians.

Month.	Victoria Vendor.	Victoria Druggists.	Outside Vendors.	Outside Druggists.	Total.	No. of Physicians issuing Prescriptions.
January	3,544	603	79	12	4,238	69
February	3,510	595	27	14	4,146	70
March	2,966	476	39	27	3,508	70
April	2,025	356	20	10	2,411	71
May	2,402	387	28	21	2,838	67
June	368	132	5	6	511	60
July	334	126	3	1	464	48
August	307	131	..	3	441	53
September	335	143	2	..	480	50
October	337	127	1	1	466	50
November	355	139	2	3	499	55
December	583	116	4	..	703	54
Totals	17,066	3,331	210	98	20,705	717

Vancouver Physicians.

Month.	Vancouver Vendor.	Vancouver Druggists.	Outside Vendors.	Outside Druggists.	Total.	No. of Physicians issuing Prescriptions.
January	10,256	5,268	43	87	15,654	214
February	9,388	3,849	30	60	13,333	206
March	9,688	3,241	31	57	13,017	202
April	6,905	2,325	14	42	9,286	196
May	9,087	2,560	30	50	11,727	197
June	985	746	2	25	1,758	178
July	810	624	1	14	1,449	175
August	1,101	808	3	18	1,930	173
September	1,214	838	5	12	2,069	172
October	1,197	643	3	12	1,855	168
November	1,486	675	1	14	2,176	179
December	2,309	717	2	9	3,037	184
Totals	54,426	22,294	165	400	77,291	2,244

APPENDIX No. 3—*Continued.*

Outside Physicians.

Month.	Outside Vendors.	Outside Druggists.	Total.	No. of Physicians issuing Prescriptions.
January	2,343	4,907	7,250	161
February	1,898	5,307	7,205	164
March	2,157	4,894	7,051	165
April	1,637	3,505	5,142	162
May	2,274	3,476	5,750	160
June	186	1,066	1,252	118
July	126	1,253	1,379	126
August	142	1,353	1,495	125
September	108	1,400	1,508	130
October	112	1,586	1,698	119
November	128	1,461	1,589	121
December	153	1,542	1,695	112
Totals	11,264	31,750	43,014	1,663

APPENDIX No. 4.

STATEMENT SHOWING THE VALUE OF LIQUOR CONFISCATED TO THE CROWN THROUGH THE PROVINCIAL POLICE AND TURNED OVER TO THE PROHIBITION DEPARTMENT DURING THE YEAR 1920.

District.	Gross Value.	Expenses.	Net Value.
Boundary District	$ 460 09	$ 43 48	$ 416 61
Fort George District	71 00	10 20	60 80
Fort St. John District	.....	.....	.....
Hazelton District	1 50	55	95
Kamloops District	2 80	50	2 30
North-east Kootenay District	8 30	3 00	5 30
South-east Kootenay District	1,818 24	260 41	1,557 83
West Kootenay District	2,570 30	297 43	2,272 87
Lillooet District	120 48	37 06	83 42
Nanaimo District	10 55	50	10 05
Prince Rupert District	181 40	19 24	162 16
Vancouver District	364 56	.....	364 56
Vernon District	.....	.....	.....
Victoria District	.....	.....	.....
Yale District	71 80	6 74	65 06
Totals	$5,681 02	$679 11	$5,001 91

Value of liquor confiscated to the Crown and held by Prohibition Department, but subject to litigation, Vancouver District, $22,089.34.

APPENDIX No. 4—*Continued.*

STATEMENT SHOWING THE VALUE OF LIQUOR CONFISCATED TO THE CROWN IN CITIES AND MUNICIPALITIES THROUGHOUT THE PROVINCE AND TURNED OVER TO THE PROHIBITION DEPARTMENT DURING THE YEAR 1920.

Place.	Gross Value.	Expenses.	Net Value.
Municipality of Burnaby	$ 5 80	.....	$ 5 80
City of Courtenay	.....	$ 40	.....
City of Cranbrook	258 67	72 51	186 16
City of Fernie	1 00	5 70	.....
City of Grand Forks	43 40	7 55	35 85
City of Ladysmith	.....	45	.....
City of Nelson	.....	2 10	.....
City of North Vancouver	3 00	.....	3 00
Municipality of Oak Bay	3,862 78	66 49	3,796 29
City of New Westminster	387 43	10 00	377 43
City of Prince George	40 90	25 45	15 45
City of Prince Rupert	16 20	8 10	8 10
Municipality of Penticton	5 36	70	4 66
Municipality of Point Grey	3 65	.....	3 65
City of Revelstoke	9 31	4 10	5 21
City of Rossland	73 47	6 55	66 92
Municipality of Saanich	239 57	10 00	229 57
City of Trail	10 80	1 70	9 10
Municipality of South Vancouver	7 35	2 50	4 85
City of Victoria	953 41	16 90	936 51
Totals	$5,922 10	$241 20	$5,680 90

Value of liquor confiscated to the Crown and held by Prohibition Department, but subject to litigation, City of Vancouver, $150,000 (approximately).

APPENDIX No. 5.

STATEMENT OF LIQUORS IMPORTED INTO THE PROVINCE OF BRITISH COLUMBIA BY LIQUOR WAREHOUSES UNDER SECTION 19 OF THE "BRITISH COLUMBIA PROHIBITION ACT" DURING THE YEAR 1920.

Brandy	gals.	6,608
„	cases	5,583
Alcohol	gals.	21,989
„	cases	538
Gin	gals.	11,717
„	cases	7,787
Scotch	gals.	29,479
„	cases	70,061
Irish	gals.	123
„	cases	1,181
Rye	gals.	28,235
„	cases	72,307
Rum	gals.	14,475
„	cases	950
Sherry	gals.	14,450
„	cases	187
Port	gals.	24,620
„	cases	1,562
Champagne, Clarets, Burgundies, and Light Wines	gals.	18,920
„ „ „ „ „	cases	2,706
Liqueurs	cases	2,084
Beer and Stout	bbls.	276
„ „	cases	1,328
Japanese Saki	„	200
Chinese Liquor	„	6,133

APPENDIX No. 6.

STATEMENT OF LIQUORS IMPORTED INTO THE PROVINCE OF BRITISH COLUMBIA BY THE GOVERNMENT FOR MEDICINAL PURPOSES DURING THE YEAR 1920.

Brandy	gals.	4,642
„	cases	1,200
Alcohol	gals.	4,640
Absolute Alcohol	cases	3
Gin	gals.	345
„	cases	722
Scotch	gals.	8,670
„	cases	12,037
Irish	„	530
Rye	gals.	5,443
„	cases	12,536
Rum	gals.	6,683
Sherry	„	623
Port	„	1,825
„	cases	100
Champagne	cases	50
Stout (imported)	doz. pints	1,200
„	doz. splits	500
Stout (local)	doz. pints	58
Ale (imported)	„	148
Beer (local)	„	148
Miscellaneous Liquor	cases	12

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PRINTING OFFICE REPORT, 1919-20.

To His Honour WALTER CAMERON NICHOL,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

In accordance with section 14 of the "Statutes and Journals Act," I have the honour to present the following Report.

I have the honour to be,
Sir,
Your obedient servant,
J. D. MACLEAN,
Provincial Secretary.

PRINTING OFFICE REPORT.

RETURN showing the Number of Copies of the Statutes, Journals, and Sessional Papers which have been bound and disposed of during the Twelve Months ending March 31st, 1920, and the Number remaining on hand at that Date, together with a Statement of the Work performed in the Printing Office for the various Departments.

Year.	Statutes.				Journals.				Sessional Papers.				Work performed.				
	On hand April 1st, 1919.	Bound.	Sold.	On hand March 31st, 1920.	On hand April 1st, 1919.	Bound.	Sold.	On hand March 31st, 1920.	On hand April 1st, 1919.	Bound.	Sold.	On hand March 31st, 1920.	No. of Jobs.	No. of Pages. Plain.	No. of Pages. Tabular.	Total No. of Pages	No. of Impressions printed.
1872	....	....	....	....	13	....	....	13	....	....	....	....					
1875	3	....	....	3	....	....	....	....	....	....	....	....					
1876	13	....	1	12	19	....	....	19	....	....	....	....					
1878	....	....	....	....	9	....	....	9	....	....	....	....					
1880	....	....	....	....	8	....	....	8	....	....	....	....					
1886	15	....	...	15	....	....	....	....	....	....	....	....					
1887	35	....	....	35	....	....	....	....	....	....	....	....					
1888	25	....	....	25	6	....	...	6	....	....	....	....					
C.A. 1888	1	....	....	1	....	....	...	....	....	....	....	....					
1889	1	....	1	....	....	....	....	....	....	....	....	....					
1890	..	....	....	....	13	....	...	13	....	....	....	....					
1891	1	...	1	....	1	....	....	1	....	....	....	....					
1893	1	....	1	....	....	....	....	....	....	....	....	....					
1895	1	....	1	....	5	....	....	5	....	....	....	....					
1896	....	....	....	....	27	....	....	27	....	....	....	....					
1897	....	....	....	....	32	....	....	32	....	....	....	....					
1898	....	....	....	....	11	....	....	11	....	....	....	....					
1899	....	....	....	....	12	....	....	12	....	....	....	....					
1901	1	....	....	1	....	....	....	....	18	...	....	18					
1902	....	....	....	....	26	....	....	26	....	....	....	....					
1903–4	...	...	....	....	12	....	....	12	....	....	....	....					
1905	....	....	....	....	13	....	....	13	7	....	....	7					
1906	....	....	....	....	41	....	....	41	34	....	....	34					
1907	131	....	....	131	20	....	....	20	....	....	....	....					
1908	63	....	1	62	2	....	....	2	2	....	2	....					
1909	75	....	....	75	41	....	....	41	33	...	....	33					
1910	132	....	3	129	59	....	....	59	....	....	....	....					
1911	53	4	5	52	155	....	...	155	....	....	....	....					
R.S. 1911	25	42	45	22	....	....	....	....	....	....	....	....					
Vol. 4 1911	21	11	14	18	....	....	....	....	....	....	....	....					
1912	234	62	41	255	240	....	....	240	82	....	....	82					
1913	433	....	50	383	180	....	....	180	2	....	....	2					
1914	118	....	50	68	207	....	....	207	9	....	....	9					
1915	113	....	63	50	63	....	....	63	16	....	2	14					
1916	59	165	64	160	161	....	5	156	6	....	....	6					
1917	200	55	86	169	62	....	2	60	15	....	....	15					
1918	107	36	114	29	25	....	6	19	23	....	5	18					
1919	.....	1011	878	133	.....	225	105	110	....	189	....	189	4,413	12,458	1,568	14,026	7,844,499

STATEMENT of the Number of Statutes sold during the Twelve Months ending March 31st, 1920; also Value of Sales of other Publications and Advertising in B.C. Gazette.

Particulars.	No. of Copies sold.	Value.
Statutes, 1876	1	$ 2 00
" 1889	1	2 00
" 1891	1	2 00
" 1893	1	2 00
" 1895	1	2 00
" 1908	1	2 00
" 1910	3	6 50
" 1911	5	10 00
Revised Statutes, 1911	45 sets	780 20
" " Vol. IV	14 vols.	62 00
Statutes, 1912	41	90 50
" 1913	50	111 50
" 1914	50	118 25
" 1915	63	140 25
" 1916	64	142 75
" 1917	86	214 25
" 1918	114	276 85
" 1919	878	2,054 50
Sale of other documents and advertising in B.C. Gazette	...	180,184 67
Total sales	...	$184,204 22

SUMMARY OF EXPENDITURE, 1919–20.

(April 1st, 1919, to March 31st, 1920.)

Salaries	$ 95,684 94
Expenses—	
Office supplies	2,070 78
Printing paper, material, etc.	48,216 50
New machinery	914 49
Stationery	33,578 87
Total expenditure	$180,465 58

PRINTING AND STATIONERY SUPPLIED TO THE VARIOUS DEPARTMENTS, BRANCHES, AGENCIES, ETC., FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1920.

Service.	Amount.
Department of Agriculture	$ 11,265 97
Department of Attorney-General	1,699 84
Inspector of Legal Offices	385 29
Registrar of Companies	2,106 04
Inspector of Municipalities	483 15
Censor of Moving Pictures	106 03
Prohibition Commission	3,064 19
Sheriffs' Offices	417 59
Provincial Police	4,987 43
Nelson Gaol	53 43
Oakalla Prison Farm	247 65
Industrial School, Boys	247 18
Industrial School, Girls	183 12
Superintendent of Neglected Children	263 55
Game Protection	1,383 26
Land Registry, Kamloops	1,189 24
" Nelson	808 54
" New Westminster	963 29
" Prince Rupert	243 81
" Vancouver	1,382 28
" Victoria	1,750 19
Supreme Court, Chilliwack	41 58
" Ladysmith	7 34
" Nelson	98 43
" New Westminster	260 63
" Prince Rupert	42 52
" Vancouver	1,309 74
" Victoria	726 39
Department of Education	7,761 62
Department of Finance	4,596 79
Inspector of Trust Companies	404 91
Comptroller-General	965 85
Surveyor of Taxes	3,610 03
Agent-General, London	72 78
Bureau of Information	4,209 56
Department of Fisheries	1,153 97
" Industries	667 95
" Lands	24,693 92
Legislation	2,244 35
Department of Labour	1,123 80
Employment Bureaus	732 42
Department of Mines	7,311 54
Premier's Office	171 95
Public Utilities Commission	905 64
Department of Provincial Secretary	2,004 99
Board of Health	2,880 24
Provincial Library	1,184 52
Provincial Museum	471 44
King's Printer	478 95
Civil Service Commission	877 53
Registration of Voters	458 18
Patriotic Fund	114 05
Returned Soldiers' Commission	1,906 54
Mental Hospital, New Westminster	689 69
" Essondale	924 98
" Saanich	240 39
Provincial Home, Kamloops	29 29
Department of Public Works	8,805 31
Inspector of Machinery and Boilers	1,212 56
Inspector of Electrical Energy	51 43
Inspector of Factories	130 49
Department of Railways	866 66
Lieutenant-Governor's Office	269 67
Carried forward	$119,941 49

PRINTING AND STATIONERY SUPPLIED TO THE VARIOUS DEPARTMENTS, BRANCHES, AGENCIES, ETC., FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1920—*Continued.*

Service.	Amount.
Brought forward	$119,941 49
Agencies.	
Alberni	614 93
Anyox	366 21
Ashcroft	547 32
Atlin	295 33
Barkerville	102 59
Clinton	288 43
Cranbrook	701 35
Cumberland	358 41
Duncan	207 26
Fairview	191 26
Fernie	144 11
Fort Fraser	321 82
Fort George	836 82
Golden	268 86
Grand Forks	70 40
Greenwood	153 78
Kamloops	605 74
Kaslo	460 75
Lillooet	160 16
Merritt	332 88
Nanaimo	898 06
Nelson	542 95
New Westminster	485 37
New Denver	41 00
150-Mile House	193 94
Prince Rupert	939 40
Princeton	206 96
Quesnel	1,956 85
Queen Charlotte	38 68
Revelstoke	490 18
Rossland	495 68
Smithers	720 66
Telegraph Creek	217 78
Trout Lake	34 06
Vancouver	1,591 24
Vernon	693 84
Victoria (Assessor)	454 96
Wilmer	50 49
Yale	53 42
Sundry Sub-Agencies	499 54
Total	$137,574 96

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

PROVINCE OF BRITISH COLUMBIA

FIRST ANNUAL REPORTS

OF THE

SUPERINTENDENT OF NEGLECTED CHILDREN

AND

MOTHERS' PENSIONS

FOR THE YEAR ENDING

NOVEMBER 30TH, 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

UNIVERSITY OF ILLINOIS LIBRARY
JAN 20 1922

To His Honour WALTER CAMERON NICHOL,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the first Annual Report of the Superintendent of Neglected Children, also the first Annual Report on Mothers' Pensions, for the year ending November 30th, 1920.

J. W. DE B. FARRIS,
Attorney-General.

Attorney-General's Department,
Victoria, B.C., February 8th, 1921.

REPORT ON NEGLECTED CHILDREN.

VANCOUVER, B.C., December 23rd, 1920.

The Honourable J. W. de B. Farris,
Attorney-General, Victoria, B.C.

SIR,—I have the honour to submit herewith my first Annual Report as Superintendent of Neglected Children for the year ending November 30th, 1920.

As this office was only opened in December, 1919, the year has been spent largely in the work of organization, and even yet is only in its initiatory stages. The first month was spent in securing offices, drawing up and having printed the necessary forms, etc., and conducting an educational campaign throughout the Province.

This had just been commenced when, at the first of the year, I was asked to take charge of and reorganize the Boys' Industrial School, which to a great extent interfered with the work of this Department.

Then in April, 1920, the "Adoption of Children Act" was passed, entailing further work for this office, as notice must be served on the Superintendent of Neglected Children in all applications for adoption. At the same time the "Mothers' Pensions Act" was approved, which necessitated reorganization and entailed a great deal of work, as shown in the report on same included herein.

NEGLECTED CHILDREN.

One of the difficulties we had to contend with in this connection was that many had the mistaken idea that it was the duty of this Department to follow up all complaints and reports of alleged neglected children and to apprehend same and bring them before the Judge for commitment, for they did not understand that this was the duty of the cities and municipalities and that our responsibility did not begin until after the child had been before the Court and had been proved to be neglected. Of course, we acted in an advisory capacity and suggested what action to take in the various cases that were reported to us.

During the year ninety-two cases have been reported to the office, involving a total of 148 children. Of these, twenty-six children were committed to a Children's Aid Society, the other cases being satisfactorily settled without Court proceedings.

Since January of this year the *per capita* grant to Children's Aid Societies taking care of children committed from unorganized districts has been paid through this Department. The amount paid is $2 per week per child. Below is a statement of the amount expended:—

Month.	CHILDREN'S AID SOCIETY OF VANCOUVER.		CHILDREN'S AID SOCIETY OF THE CATHOLIC ARCHDIOCESE OF VANCOUVER.		TOTAL.	
	Children.	Amount.	Children.	Amount.	Children.	Amount.
January	31	$ 269 71	56	$ 496 00	87	$ 765 71
February	30	248 57	56	464 00	86	712 57
March	30	252 00	56	496 00	86	748 00
April	28	240 00	60	483 71	88	723 71
May	28	248 00	59	522 57	87	770 57
June	30	236 57	59	505 71	89	742 28
July	31	269 72	60	531 43	91	801 15
August	30	265 72	61	544 28	91	810 00
September	33	287 42	61	516 28	94	803 70
October	36	317 14	57	504 85	93	821 99
November	40	320 00	53	454 28	93	774 28
Totals	347	$2,954 85	638	$5,519 11	985	$8,473 96

The actual number of children paid for during the year from the above were:—

Society.	Boys.	Girls.	Total.
Children's Aid Society of Vancouver	31	19	50
Children's Aid Society of the Archdiocese of Vancouver	35	29	64
Totals	66	48	114

Over and above this amount grants to the amount of approximately $13,000 were made to societies taking care of orphan and destitute children.

INSPECTION OF INSTITUTIONS.

I inspected the home of the Children's Aid Society of Vancouver on Wall Street, and also the Providence Orphanage, New Westminster, in which the wards of the Children's Aid Society of the Catholic Archdiocese of Vancouver are placed, and found that the children there were being well taken care of by those responsible.

"ADOPTION ACT."

Since the passing of the "Adoption Act" in April, 1920, there have been filed at this office forty notices of application for adoption. Fourteen of these were boys and twenty-six were girls.

This Act will be of great value and protection to children, as the child, once it is legally adopted, has the same rights as a natural child.

When the papers are properly filled in there is, as a rule, no difficulty in putting through the order.

I would like to point out that the "Adoption of Children Act" and the "Mothers' Pensions Act" will provide for many children who would otherwise have to be dealt with under the "Infants Act."

The "Mothers' Pensions Act" will enable mothers, who because of their inability to provide for them would have had to place their children in an institution, to care for these children at home.

The "Adoption of Children Act" will do away with the difficulties we have had to contend with in the past in regard to foster homes, as before the foster child was not protected in cases where the foster parents died without making a will in which the child was specifically mentioned.

REPORT ON MOTHERS' PENSIONS.

The Honourable J. W. de B. Farris,
Attorney-General, Victoria, B.C.

SIR,—I have the honour to submit herewith the first Annual Report on the Work of Mothers' Pensions up to November 30th, 1920.

MOVEMENT.

The movement for the enactment of a mothers' pension law in British Columbia began definitely as early as 1911 by the various women's organizations interested in social reform calling attention to the justice of the principle of such a law and passing resolutions in favour of it.

PRINCIPLE.

The principle is simple. It is the recognition of a widely held and deeply rooted conviction that home-life and a mother's care are of such value in the proper rearing of children that no child should be deprived of their benefits on account of poverty alone.

HISTORY OF MOVEMENT.

The very rapid growth of the movement in a very brief period of years shows what a long-felt want it has supplied. Like many great movements, it has been to some extent a matter of evolution.

Compulsory education laws had made it necessary to make State provision in the way of clothing, books, and, in some cases, of money for the children of indigent parents to attend school.

The Oklahoma law, enacted April 10th, 1908, provided for a "school scholarship" equivalent to the earnings of a child to be paid to the widowed mother when such earnings were regarded as necessary to her support.

In Ontario in 1914 the Local Council of Women requested permission to create a fund to be known as the "Mothers' Pension Fund," to be dispensed to mothers who felt obliged to take their children from school before they were 14. The advent of the war prevented this being carried out.

The placing of orphan and neglected children in foster homes instead of institutions was a step in the right direction and worked untold benefit to the children.

Public opinion in the matter of providing help in some better way than by the older forms of poor relief or the uncertainty of private charity had been steadily growing, and since the passing of the first definite "Mothers' Pension Act" in Missouri on April 7th, 1911, followed by the Illinois "Funds to Parents Act," also of 1911, the enactment of mothers' pension laws has gone forward by leaps and bounds. Almost every State in the neighbouring republic has passed such laws.

In Canada, Manitoba was the first Province to pass a "Mothers' Pension Act" in 1916. Saskatchewan followed in 1917, Alberta in 1919, and British Columbia, April 17th, 1920. Ontario has passed an Act to come into force in October, 1920, and Nova Scotia has one under consideration.

PREPARATION-WORK.

In British Columbia, after much education and publicity-work, it was realized that the time had come when the Legislature would have to be approached.

A Committee was appointed by the New Era League of Vancouver, composed of Mrs. J. Allan Clark, Mrs. H. G. Taylor, and Mrs. Jean K. Macken, who were assisted by Mrs. John Forrester, of New Westminster; Mrs. Gordon Grant, of Victoria; Mrs. J. H. MacGill and the late Mrs. W. H. Griffin, of Vancouver.

They organized a large deputation of representative bodies, and through the Attorney-General, the Hon. J. W. de B. Farris, the Government was approached during the session of

1918. Mrs. Ralph Smith, M.L.A., who had ever championed and ardently worked for the cause, introduced the delegation. The following list of delegates and organizations shows how widely spread the realization of the necessity of such a law had become:—

Leader of delegation, Mrs. J. A. Clark, New Era League; National Council of Women, Mrs. R. S. Day; Provincial W.C.T.U., Mrs. Spofford; Victoria Local Council of Women, Miss Mary Lawson; New Westminster Local Council of Women, Mrs. J. Forrester; Vancouver Local Council of Women, Mrs. A. U. de Pencier; Nanaimo Local Council of Women, Mrs. John McMillan; Women's Institutes, Mrs. Ralph Smith; Canadian Club, Mrs. J. White; Child Welfare, Mrs. T. Harold; Daughters of the Empire, W.B.A. Maccabees, Mrs. Hugh Wilson; American Woman's Club, King's Daughters, Mrs. George W. Beattie; New Westminster W.C.T.U.; New Westminster Liberals, Mrs. John Forrester; Nanaimo W.C.T.U.; Vancouver Liberals, Mrs. Stanley Brown; Woman's Independent Political Party, Mrs. Gordon Grant; Citizens' Union, Mrs. A. Borland; Woman's New Era League, Mrs. H. G. Taylor; Trades and Labour Council, Miss H. Gutteridge; University Women's Club, Vancouver, Mrs. J. H. MacGill; University Women's Club, Victoria, Mrs. (Captain) Clark; Prince Rupert, Revelstoke (proxy), Mrs. Ralph Smith; Equal Franchise Association, Mrs. W. H. Morrow; Reconstruction League, Miss McLeod; Daughters of Scotia, Mrs. I. Rose; Vancouver Ratepayers' Association, Mrs. J. K. Macken; Benevolent Association, New Westminster, Mrs. Chas. Welsh; Woman's Forum, Mrs. John Dixon; W.C.T.U., Vancouver, Mrs. Wm. Bryan; Chilliwack, Miss Barrow; Victoria City, Mayor Todd; Vancouver City, Mayor Gale; New Westminster, Mayor Gray; Vancouver City Relief, Rev. George Ireland; Ministerial Association (Lower Mainland), Rev. Mr. Stevens; Salvation Army, B.C., Commandant Jaynes; Provincial Child Welfare, Mr. Dougan; B.C. Great War Veterans, Captain Whittaker; Fraser Valley Institutes, Mrs. Fadden; Kaslo, Mrs. John Keen; B.C. Federation of Labour, Mr. D. McCallum; Ministerial Association, Victoria, Rev. H. S. Osborne; the Community Home Service; American Girls' Club; North Vancouver Suffrage Societies; Federation of Parent-Teachers' Associations; South Vancouver Women's Forum; Victoria Order of Nurses; Provincial Graduate Nurses' Association; Local Graduate Nurses' Association; Widows, Wives, and Mothers of Great Britain's Heroes, Mrs. J. Kemp.

The Premier, the Hon. John Oliver, in eulogizing the delegation, said it was the most businesslike and representative delegation that had ever appeared before the Government.

So convincing were the arguments in favour of the Act that the Government appointed a Commission to report on the advisability of bringing down legislation in the matter. This Commission, composed of Mr. E. S. H. Winn, Mrs. C. E. Spofford, Mr. Duncan McCallum, and Mr. T. B. Green, was called the Health Commission, and reported on the following questions: Health Insurance, Public Health Nursing, Mothers' Pensions, and Maternity Benefits.

The report of this Commission was received by the Provincial Parliamentary Session of 1919–20, and in it the necessity for mothers' pensions was so strongly emphasized that the existing "Mothers' Pension Act" was passed on April 17th, 1920.

TERMS OF ACT.

Under the Act the following are included as properly being qualified to receive assistance:—
Any mother who is:—

(*a.*) A widow; or

(*b.*) A married woman whose husband is an inmate of the penal institution or public hospital for insane; or

(*c.*) A woman whose husband is unable to support his family by reason of sickness or accident arising while his wife was residing in this Province; or

(*d.*) A deserted wife; or

(*e.*) Any other person whose case, in the opinion of the Superintendent, is a proper one for assistance under the provisions of this Act.

It will thus be seen that it is very broad in its scope and application.

ADVISORY BOARDS.

Following the passing of the Act, Advisory Boards to deal with cases making application have been appointed by an Order in Council to co-operate with the officials of the Mothers'

Pension Department, which was placed under the supervision of the Superintendent of Neglected Children. The existing advisory committees are as follows:—

Vancouver—Judge Helen Gregory MacGill, Mrs. Robert McNair, Mrs. J. A. Clark, Mrs. Joseph Sheasgreen, Mrs. J. C. Kemp, and Judge Shaw.
Victoria—Mrs. C. E. Spofford, Mrs. Stewart Henderson, and Mrs. Robert Dinsdale.
Nanaimo—Mrs. G. B. Brown, Mrs. Margaret Neave, and Mrs. Maude Woodcock.
New Westminster—Mrs. Christina Forrester, Mrs. Helen Smith, and Mrs. Maud Dorgan.
Revelstoke—Mrs. J. B. Ward, Mrs. Alex. Honson, and Mrs. W. J. Dickey.
Fernie—Mrs. Lorne Workman and Mrs. Annie Duthie.
Cranbrook—Mrs. Gertrude Miles, Mrs. Verna Constantine, and Mrs. Louisa Roberts.
Nelson—Mrs. Elesa McCulloch, Mrs. Annie Rutherford, and Mrs. Marion Crease.
Rossland—Mrs. Margaret York, Mrs. Isable Stephens, and Mrs. Sarah Pitt.
Trail—Mrs. Lillian Thom, Mrs. Jessie Walker, and Mrs. Teresa Martin.
Penticton—Mayor Chambers, Albert H. Huntley, Mrs. Agnes Smith, Mrs. Maud Burtch, and Mrs. Veila McGregor.
Vernon—Mrs. D. D. Lockhart, Mrs. Mary Knight, and Mrs. Elsie Richards.
Armstrong—Mrs. Frances Groves, Mrs. Jennie Hall, and Mrs. Susie Inglis.
Kelowna—Mrs. Mary Cameron, Miss Minnie Reckie, and Mrs. Jennie McDonald.
Kamloops—Mrs. D. B. Johnstone.

Administration.

Very shortly after the passing of the Act applications began to pour into the office from all parts of the Province. Up to the end of June, 1920, 390 names and addresses were placed on file, and as soon as the printed forms were available they were mailed to the applicants. Ending with November 30th, 1920, there have been 1,182 applications placed on file and they still continue to be received in large numbers.

Early in July six temporary investigators were appointed to visit and report on the applications received. At present there are two investigators for Vancouver and the surrounding district; one for the unorganized districts of the Mainland; one for the City of Victoria and one for the other parts of Vancouver Island.

The Local Advisory Boards visit and report on the cases in their own districts.

The Advisory Board for Vancouver was formally inaugurated and the Act declared operative on Friday, September 3rd, 1920, by the Hon. the Attorney-General, Mr. J. W. de B. Farris, under whose Department the Act is administered and to whose sympathetic attitude towards the cause much of the credit of the passing of the Act is due.

In addition to the members of the Board, there were present Mr. D. B. Brankin, Superintendent of Neglected Children; Mr. G. F. Pyke, Assistant Superintendent; Mrs. Ralph Smith, M.L.A., who is now joyfully realizing the culmination of her efforts on behalf of the mothers' pensions; Mr. M. A. Macdonald, M.L.A., and Mr. J. S. Cowper, M.L.A., who had assisted with the measure before the Legislature.

A "movie" film of the proceedings was taken by Photographer Kean and appeared in due course on the screens of this and other Provinces.

Ending with November 30th, 636 pensions have been granted in the whole Province.

During the month of September, 1920, there was paid out for mothers' pensions in British Columbia the sum of $55,227.50. This included in many cases pensions for the months of July and August as well, for those who had applied before July 15th, 1920. In October $28,750.50 was expended and in November $34,511.50, making a grand total of $118,489.50.

It was a great boon to many of the mothers to receive the pension for three months in a lump sum in September. They were enabled in many cases to take their children out of the orphanages, rent little homes or rooms, purchase furniture, and provide for the winter clothing and fuel.

Letters of Appreciation.

Many were the letters of appreciation and gratitude received from the mothers who were benefited. To many who had struggled on for, deprived of the rightful bread-winner, with failing health, due to the double burden of providing for the family and caring for the home, as well as in some cases nursing invalid husbands, it seemed, as they said, "too good to be true."

The following letters will give some idea of the gratitude of the mothers:—

Mr. D. B. Brankin.

DEAR SIR,—I beg to acknowledge the receipt of cheque in October, also the one from your office of November 2nd.

Words fail to express my gratitude for same, which certainly has been a great help to us.

Thanking you and all concerned in this good work,

I am,

Yours gratefully,

.....

Mr. Brankin.

DEAR SIR,—I hardly know how to begin to express my heartfelt thanks and appreciation to you in allowing me the mothers' pension. It has been such a blessing to me in getting us warm clothes and fuel, but words fail me; all I seem to be able to say is many, many thanks and may God bless you all in the good work you have undertaken.

I beg to remain,

Yours very sincerely,

.....

Mr. Brankin.

DEAR SIR,—Thank you for the mothers' pension check I received this afternoon, for which I am indeed grateful. It will enable me to care for my children in a better way than I have been able to do this last three years, and no one knows how heavy a mother's heart is when she has to leave her children to look after themselves while she goes to work to keep them, and a mother is very dear to a child when it is left alone all day, but I am so thankful that this pension will give us the chance of giving what is every child's birthright, a mother's love and care.

Yours very gratefully,

.....

CLASSIFICATION OF APPLICATIONS.

The large number of applications has been due to various causes. Many cases were those who had been receiving help from the various cities and municipalities for some time and who would now come under the Act.

The "flu" epidemic had caused a very large number of necessitous cases. War conditions had largely increased the number of deserted wives and families. Many of the men lived with other women and even married other wives overseas and are beyond the jurisdiction of this Province. The proximity of the United States has enabled many deserting husbands to shirk their responsibilities and cross the border.

In classifying the applications that have been filed, investigated, and considered by the various Boards, we find that out of 1,000 cases 665 are widows, 203 are deserted wives, 76 have husbands who are incapacitated from various causes, tuberculosis, paralysis, arthritis, and other forms of rheumatism predominating. Those confined in mental hospitals number 24 and in prison 6. Divorcees number 15, unmarried mothers 7, and 5 have remarried.

The children number 1,075 boys and 1,013 girls; in all, 2,068. This number does not include children over 14 and under 16 who are earning wages.

CLAUSES WHICH RENDER APPLICANTS INELIGIBLE.

The number of cases not granted come under sections 4, 5, and 7 of the Act, which state that:—

"4. No mother shall be entitled to apply for or receive an allowance under this Act unless:—

"(*a.*) She is a British subject; and

"(*b.*) Has been a resident of this Province for at least eighteen months prior to making application for assistance under this Act; and

"(*c.*) Has a child or children under the age of 16 years living with her; and

"(*d.*) Is without the necessary means with which to support this child or children.

"5. No application for an allowance under this Act shall be granted unless the Superintendent is of the opinion:—

"(*a.*) That the applicant is a fit and proper person to have the custody of her child or children; and

"(*b.*) That it is in the best interests of her child or children that the applicant should have the custody of them.

"7. Payment of the allowance granted under this Act in respect of any beneficiary shall cease:—

"(*a.*) Upon the beneficiary ceasing to reside within the Province; or

"(*b.*) Upon the remarriage of the mother."

Classification of those Ineligible.

Cases coming under these heads may be classified as follows:—

(1.) Not indigent number 69 and include cases where there were other sources of income sufficient to maintain the family either from investments, property, rentals, boarders, or older children who were contributing.

(2.) Those who were not eligible under the terms of the Act included the following:—

(*a.*) Those in receipt of military pensions number 13; of workmen's compensation, 18.

(*b.*) Those who had not completed the eighteen months of residence number 28.

(*c.*) Those whose husbands were not British subjects number 27. In many of the latter cases the wives were themselves of British birth and even native-born British Columbians. They felt the hardship of the Federal Act that made them of the nationality of their husband, especially when he had not taken out papers of naturalization after years of residence in British Columbia.

(*d.*) In some cases the mother felt that she could not give up her salary when it was largely in excess of the pension. Some, indeed, thought they should get the pension in addition to a fairly large salary.

(*e.*) In some cases it was felt that the children would not be benefited by the pension being granted.

(*f.*) In one case a widow and four children were deported by the Immigration Department.

(3.) Pensions lapsed or were withdrawn from the following causes:—

(*a.*) Five cases of remarriage of the mother.

(*b.*) One case of the death of the mother receiving pension.

(*c.*) Two cases of the death of children.

(*d.*) One case of the child reaching the age of 16.

These latter cases will, of course, increase in number each month.

One application was happily withdrawn when the husband, who had been a prisoner of war in Germany, was able to get in touch with his family.

Some applicants withdrew of their own accord when they understood they were not eligible under the terms of the Act.

Work of Advisory Boards.

Up to November 30th, 1920, the Vancouver Advisory Board has held twenty-one sessions and the members have devoted themselves assiduously to deciding each case on its own merits, always keeping before them the one principle of what is best for the child in all of the varying conditions that are presented.

In the District of Kamloops Mrs. D. B. Johnstone has carried on the work up to the present alone. She reports having investigated twenty-three cases, and is glad to state that where the pension has been granted the children are more suitably clad, look healthier and happier, and a great burden has been lifted from the shoulders of the mother.

In Revelstoke the Advisory Board held its organization meeting on August 25th, 1920. It has held eight meetings up to November 30th, 1920, and dealt with nine applications. The Board notices a marked improvement in the home conditions of those who have received pensions and states that a general feeling of appreciation prevails among them.

In Armstrong the Board did not receive its official appointment until October 28th, 1920. Some applications had been dealt with before it was organized. Two cases were dealt with up to November 30th, 1920. Mrs. Susie Ingles writes of one case: "A more grateful little mother you could not imagine. She often says that the pension of $50 a month takes her off 'worry street' and places her where she can give her little ones what they need."

The Nelson Advisory Board held its first meeting on September 2nd, 1920. It has held six meetings up to November 30th, 1920, and has investigated eighteen cases, of which fourteen were granted. Mrs. Crease for the Nelson Board writes: "The beneficiaries in Nelson are most grate-

ful and we think that as an economic question it will eventually pay the State an hundredfold. The mothers will be able to keep their children at school longer and better fit them to care for the mothers themselves later. One said: "Now I shall be able to put my girl through for a teacher, and look what that means. She'll help us all later for she is a good girl." In several cases the mothers were working too hard and for them the grant is a great boon."

The Westminster Advisory Board held its inaugural meeting on Tuesday, September 7th, 1920, and has investigated forty-eight cases, recommending thirty-four for pensions. Ending with November 30th, 1920, the Board has held nine meetings. Mrs. Dorgan, the Secretary, writes: "All recipients, as far as we are able to investigate, are making good use of the funds and in some cases the pension is nothing short of a blessing. Owing to the large number of cases that are continually coming in the Board cannot carry on the follow-up work systematically. The Board would suggest that clergymen who recommend applicants should familiarize themselves with the terms of the "Mothers' Pensions Act," as the Board receive many cases where the applicants do not in any way come under the Act, which makes unnecessary work for them."

The Trail Advisory Board since being organized has held two meetings, the first on September 17th and the second on November 5th. At the first meeting six cases were brought up and it was decided to interview these at once. Of the six, five have been granted the pension; the other one is still in abeyance. At the second meeting three more cases were discussed, and of these three, one has been granted a pension, the other two not being indigent. In general the people of the district appreciate the benefits derived from the Act and consider that so far it has been quite satisfactorily administered. It has proved a great boon to those mothers actually in need of help and probably next to the "Workmen's Compensation Act" is the most popular piece of legislation of recent years.

The Rossland Advisory Board since its appointment in July has held meetings from time to time as the applications have been received and has kept in touch with applicants since. Twelve cases have been investigated; ten of these are now in receipt of the pension, one has proved not indigent, and one is now being dealt with. The amount distributed in Rossland up to the end of November is $1,943.10. Twenty-three children under the age of 16 have been benefited not only by having their mother with them, but by her ability, through the means of mothers' pensions, to procure the necessities of life more readily. The general feeling, particularly where there are a number of very young children, is that this assistance is a godsend.

As some of the mothers now receiving help from the Patriotic Fund automatically cease to be eligible for that relief, they may be expected to apply for mothers' pensions.

Too much praise cannot be given to the various Advisory Boards throughout the Province. Their work of visiting, investigating, and keeping in touch with the various families has been wholly a labour of love for public welfare. They will reap their reward in the knowledge that they have so infinitely bettered conditions among the many widows and children.

The happier and more contented mother has a different outlook on life and can approach the questions that confront her in the care and upbringing of her children with a stouter heart.

Those of us who have been in close personal touch with the mothers themselves cannot but express our great admiration for the kind of women who are receiving pensions. Nowhere could a better type of mother be found than these brave women who have in their times of adversity tried to do double duty to their children, in many cases causing permanent detriment to their health.

PROBLEMS.

Many are the difficult problems that concern the Advisory Boards in the decisions they reach regarding each application.

(1.) For example, what constitutes indigence in the mother? Some hold property assessed at a value over and above the amount stipulated have it heavily encumbered or for other reasons it is not revenue-producing. Where there is no will it cannot be disposed of during the minority of the children.

(2.) Where there are older children contributing to the support of the home there are circumstances which prevent their giving what would be sufficient for their board; they may have incurred debts for their education which have to be paid.

(3.) Where there are children over the school age of 14 and under 16 employed are earning a little money, the question arises, should they be granted pensions?

(4.) Where there are relatives in the home who are not able to contribute sufficient for their support, would the granting of the pension assist them instead of the children?

(5.) Should provision be made for children *in utero* or those conceived while the husband is incapacitated for work and the family receiving a pension?

(6.) A rather remarkable situation is met with in the case of deserted wives who have secured legal separations with orders not sufficient for the support of themselves and their children, but whose papers have been drawn up with a clause barring them from taking further legal proceedings against the deserting husband and father. The question arises, should the man be free to throw his responsibility upon the State?

In the outlying districts of the towns and cities many of the mothers own their own little homes, in some cases free from encumbrances. In these cases the problem of living is somewhat reduced.

Housing conditions in the congested districts of the cities are serious. It is especially noticeable in rooming-houses, where the overcrowding of families and inadequate sanitary arrangements are a menace to health.

Mothers whose pensions are so insufficient that they work part of the time are obliged to live near their work to save time and car fare. These conditions, coupled with the street environment, are detrimental to the children.

More stringent enforcement of the laws, especially those relating to housing and health conditions, and also the "Deserted Wives Act," would assist the Advisory Board materially in their decisions.

Speaking generally, the administration of the "Mothers' Pensions Act," even for the very short time it has been in force, has accomplished what its most earnest advocates hoped it would do in the cause of social reform.

I have the honour to be,
Sir,
Your obedient servant,
DAVID B. BRANKIN,
Superintendent of Neglected Children.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1921.

REPORT

Of the Minister of Justice upon the Statutes of the Legislative Assembly of the Province of British Columbia passed during the Session of 1920.

By Command.

J. D. MacLEAN,
Provincial Secretary.

Provincial Secretary's Office,
August 18th, 1921.

AT GOVERNMENT HOUSE,
VICTORIA, B.C., 6th May, 1921.

SIR,—I am directed by His Honour to inform you that he is in receipt of a dispatch from the Secretary of State with reference to the Statutes of the Legislature of this Province passed in the tenth year of His Majesty's reign, 1920, which are left to such operation as they may have.

The Secretary of State also refers to the Act to amend the "Vancouver Island Settlers' Rights Act, 1904," and forwards a certified copy of an Order in Council dated the 27th of April, P.C. 1444, dealing with the subject, which is herewith enclosed.

I have the honour to be,
Sir,
Your obedient servant,

H. J. S. MUSKETT,
Private Secretary.

The Honourable the Provincial Secretary.

P.C. 1444.

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Deputy Governor-General on the 27th April, 1921.

The Committee of the Privy Council have had under consideration a report, hereto attached, dated 29th March, 1921, from the Minister of Justice, with reference to the Statutes of the Legislature of British Columbia passed in the tenth year of His Majesty's reign, 1920, and received by the Secretary of State for Canada on the 28th April, 1920.

The Committee concur in the views and recommendations of the Minister of Justice as set out in the said report, and advise that a copy of this minute, together with a copy of the said report, be transmitted to the Lieutenant-Governor of British Columbia for the information of his Government.

All of which is respectfully submitted for Your Excellency's approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council.

His Honour the Lieutenant-Governor of British Columbia.

DEPARTMENT OF JUSTICE, CANADA.

OTTAWA, 29th March, 1921.

To His Excellency the Governor-General in Council:

The undersigned has had under consideration the Statutes of Legislature of British Columbia passed in the tenth year of His Majesty's reign, 1920, and received by the Secretary of State for Canada on 28th April last, and he is of opinion that these Statutes may be left to such operation as they may have. There is included in the printed volume chapter 97, "An Act to amend the 'Vancouver Island Settlers' Rights Act, 1904'" (assent reserved), which provides that "Section 3 of the 'Vancouver Island Settlers' Rights Act, 1904,' being chapter 54 of the Statutes of 1904, is amended by striking out the words 'within twelve months from the coming into force of this Act' in the second and third lines of said section, and inserting in lieu thereof the words 'on or before the first day of September, 1920.'" This provision is simply a reproduction in terms, with substitution of dates, of a Bill passed by the Legislative Assembly of British Columbia bearing the same title, and reserved by His Honour the Lieutenant-Governor for the signification of Your Excellency's pleasure of 29th March, 1919. By Order in Council of 31st January, 1920, it is stated, referring to the latter Bill, that the proposed legislation is clearly in conflict with the policy of Your Excellency's Government as enunciated by Order in Council of 30th May, 1918, disallowing a former Statute of British Columbia, chapter 71 of 1917, and that it was consequently not a measure which could receive the approval of Your Excellency's Government.

For the same reason the undersigned recommends that no action be taken upon the present Bill, and that His Honour the Lieutenant-Governor of British Columbia be informed that Your Excellency's Government has so determined.

The undersigned recommends, moreover, that a copy of this report, if approved, be transmitted to the Lieutenant-Governor of British Columbia for the information of his Government.

Humbly submitted.

(Sgd.) CHAS. J. DOHERTY,
Minister of Justice.

VICTORIA, B.C.:
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1921.

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